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Cellular nets to use IBM plan for data

By Bob Brown
Senior Editor

SANTA CLARA, Calif. — Nine major cellular carriers last week pledged support for a new packet-handling technology developed by IBM that will greatly expand the data transmission capabilities of their networks.

The carriers are hoping to offer packet-based services that are faster and less expensive than current cellular data offerings.

While specific plans have not been announced, the carriers said they could begin rolling out as early as the first quarter of next year services that will enable mobile workers to transmit facsimiles and electronic mail and tap into remote databases from laptops.

The cellular data technology carriers have backed is IBM's Celluplan II, which fills idle capacity on cellular nets with data packets without disrupting or degrading voice traffic. IBM is working with the carriers to develop specifications for common data services based on Celluplan II as well as other technologies devised by the

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NETLINE

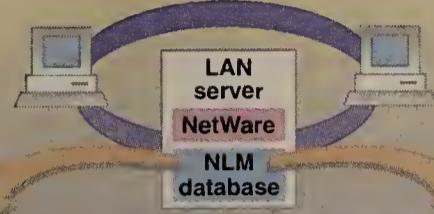


FCC DECISION TO LET AT&T customers modify custom net deals promises to help some users, hinder others. Page 4.

ASCOM TIMEPLEX set to unveil mux that lets users extend corporate backbones to smaller sites. Page 4.

SYNOPTICS SOFTWARE lets DEC, HP and IBM systems manage hubs. Page 4.

Risks and rewards of NLM databases



Rewards:

Performance. Databases running as NLMs under Novell, Inc.'s NetWare can offer high performance.

Installed base. An NLM database appeals to the large installed base of NetWare users.

Familiarity. Users are familiar with NetWare and may be reluctant to run databases on other platforms.

NLM = NetWare Loadable Module

GRAPHIC BY SUSAN SLATER

Risks:

No protected mode. NLM databases and applications can overwrite source code or data of other applications and cause NetWare to crash.

Scheduling tasks. NetWare does not schedule server CPU time among tasks, so NLMs can stall or slow down.

Memory management. NLM databases must incorporate their own memory management schemes, which can affect performance, especially when loading large files.

SOURCE: NETWORK WORLD

NetWare users explore the dark side of NLM databases

By Timothy O'Brien
West Coast Bureau Chief

EMERYVILLE, Calif. — Sybase, Inc. will soon join the growing list of vendors offering NetWare Loadable Module (NLM) versions of their database servers.

Sources close to the company said Sybase plans a May 19 introduction of its SQL Server NLM, with shipment scheduled for late summer or early fall. The firm is not offering details about the announcement but confirmed that

an NLM version is under development.

Sybase, like rivals such as Oracle Corp., is hoping to profit from the huge base of Novell, Inc. NetWare local-area networks by providing a database server tuned for high performance.

But analysts warn that in exchange for the performance gains that result from running databases as NLMs under NetWare, users take on more risks

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IBM to pull the plug on its OfficeVision/2

Big Blue to resell Notes, cc:Mail as replacement for trouble-plagued OfficeVision/2 LAN wares.

By Michael Cooney
and Timothy O'Brien
Network World Staff

WHITE PLAINS, N.Y. — In a move that will seal the fate of its struggling OfficeVision/2 LAN Series, IBM is expected to announce soon that it will cease development of the software and market Lotus Development Corp.'s Notes and cc:Mail as replacements.

Although OfficeVision/2 has already shipped to several hundred users, IBM has had problems delivering all the promised functionality for its flagship Systems Application Architecture (SAA) product, which was intended to work hand in hand with OfficeVision systems on IBM hosts and minicomputers.

A recent report from Patricia Seybold's Office Computing Group described OfficeVision/2 as a "troubled product" that "required comprehensive revisions before it would have satisfied the needs of departmental users."

IBM's upcoming announcement will build on a deal an-

nounced last June in which IBM planned to resell Notes and cc:Mail alongside OfficeVision/2. IBM had also said key elements of Notes technology would be incorporated into OS/2 and OfficeVision/2. Now, however, IBM is ex-
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IBM leans on Lotus

IBM expected to:

- Scrap development work on its OfficeVision/2 LAN Series software.
- Market Lotus Development Corp.'s Notes and cc:Mail products as replacements for OfficeVision/2.
- Develop gateways from Notes and cc:Mail to AS/400- and host-based OfficeVision systems.
- Integrate key OfficeVision and Lotus capabilities, such as calendaring and directories.

IBM Lotus

GRAPHIC BY SUSAN SLATER

Microsoft, DEC to align architectures

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. and Microsoft Corp. last week expanded their joint product development agreement to foster interoperability and application portability between key hardware and operating system platforms.

As expected, both companies said they will port Microsoft's Windows NT operating system to DEC's Alpha Reduced Instruction Set Computing (RISC) hardware architecture and jointly promote the Alpha technology.

DEC also pledged to align, over the long term, its Network Application Support (NAS) architecture with Microsoft's Windows

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users to quickly and easily churn out IVR programs that pave the way for callers with push-button telephones to do everything from retrieving checking account balances to entering orders.

Buyers will also find that IVR vendors are increasingly offering plug-in boards that make it possible for callers with rotary-dial telephones to use IVR applications. And many

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IBM, Parallan to announce superserver marketing deal

Big Blue to take over all manufacturing and sales, sell Parallan's Server 290 line under own label.

By Caryn Gillooly
Senior Editor

NEW YORK — IBM is expected to provide new details this week about an exclusive marketing and manufacturing agreement it has signed with superserver vendor Parallan Computer, Inc. that will essentially transform Parallan into an IBM development company.

Under terms of the agreement, which is scheduled to be revealed fully early next month, IBM is expected to purchase a stake in Parallan and take over all manufacturing, marketing and sales responsibilities. IBM will

sell Parallan's Server 290 line of superservers under its own label.

The companies are also expected to work together to incorporate Parallan's multiprocessing and superserver technology into future IBM-developed products.

According to sources, the Mountain View, Calif.-based Parallan will continue to operate as an independent company.

Although he declined to confirm the pending agreement, Davis Fields, vice-president of marketing at Parallan said, "We've been involved in a search for a

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Early users detail network features of Windows pack

Product includes new networkable version of DDE.

By Margie Wylie
Senior Editor

SAN FRANCISCO — Pre-beta copies of network-aware Windows and DOS packages that landed on the doorsteps of beta testers last week shed more light on Microsoft Corp.'s upcoming releases.

In addition to the LAN Manager-based peer-to-peer file and printer sharing capabilities and MS Mail 3.0 client expected in both products, Windows for Workgroups (also known as Windows Plus, WinBall and Sparta) will offer a networkable version of Dynamic Data Exchange

(DDE) that can handle objects as well as text.

Also, both Windows for Workgroups and its counterpart for DOS, MS-DOS Connection for Workgroups, will offer configuration and interface improvements that make installing and using network services simpler, beta testers said.

Network Dynamic Data Exchange (NetDDE) will let Windows for Workgroups users create "hot links" between applications that reside on different machines on the network. Users publish DDE data on the Clipper

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BT North America details major net expansion plan

By Bob Wallace
Senior Editor

SAN JOSE, Calif. — BT North America, Inc. last week detailed a massive network expansion plan that will enable it to offer one-stop network shopping in more countries than any other value-added network provider.

The \$500 million expansion will enable BT North America to offer direct access to its Global Network Services (GNS), including X.25, messaging and protocol-conversion services, in 62 countries by 1994.

BT North America will also make its frame relay service

available internationally and will offer higher speed access to the service. In addition, it will be the first frame relay provider to support switched virtual circuits and a frame relay-to-X.25 conversion capability.

"This puts BT [North America] ahead of the pack by a sizable margin," said Rick Malone, a principal with Vertical Systems Group, a Dedham, Mass., consultancy and research firm. "Any way you cut it, BT [North America] comes out on top."

According to Peter Cook, BT North America's GNS product and

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Briefs

DEC plans gigabit-speed switch. Digital Equipment Corp. will announce at DECworld '92 next week plans to build GIGAswitch, a crossbar switch that ultimately could have aggregate throughput of 3.6G bit/sec and be capable of making more than six million dynamic connections per second. The switch will be used to link systems, switches and 100M bit/sec Fiber Distributed Data Interface local-area networks. The initial switch will support 22 FDDI ports and a T-3 wide-area net interface. A maximum of four GIGAswitches can be linked.

AT&T adds "instant" 800-call reports. AT&T last week rolled out a set of seven management features that enable customers to produce nearly real-time traffic reports for 800-number services. The offerings allow customers to collect and analyze 800 calls within three to five minutes after a call is placed. Previously, they had to wait one to three days for the same reports. One of the products, Inbound AccuMaster Services Personal Computer, is a new MS-DOS software package that allows customers to conduct traffic analysis on a PC.

IBM broadens reach. IBM and NetManage, Inc. this week are expected to announce a deal through which IBM will license Cupertino, Calif.-based NetManage technology. Chameleon, NetManage's flagship product, lets Microsoft Corp. Windows users exchange electronic mail and files with other machines via the Transmission Control Protocol/Internet Protocol. While the companies declined to say to what extent IBM will use the technology, analysts said IBM could offer TCP/IP software for clients in an OS/2-based network.

Firm gets an early jump on MIME. Innosoft International, Inc. of Claremont, Calif., last week announced electronic mail software based on the Multipurpose Internet Mail Extension (MIME) standard soon to be approved by the Internet Activities Board. MIME provides a uniform method for transferring binary files as well as audio and video messages over Transmission Control Protocol/Internet Protocol networks. The software, which runs under Digital Equipment Corp.'s VMS operating system, will be available in 30 days, with subscription prices starting at \$1,095 per year.

Hotels to offer in-room faxes. Rochester Telephone Corp. last week said it will partner with AlphaNet Telecom, Inc. to offer in-room facsimile service for hotel guests. Hyatt Hotels Corp. will use InnFax at its Michigan Suites and Park Hyatt hotels in Chicago, and Delta Hotels and Resorts will use the service in its Meadowvale Inn in Toronto.

PacBell unveils info service. Pacific Bell and Dow Jones & Company, Inc. last week announced plans to jointly offer a voice mail-based news service to a limited number of consumers. The offering, dubbed the Daily Reporter, will be based on Pacific Bell's Message Center voice mail offering and will be available to subscribers in the 213, 818, 310, 714 and 805 area codes. The service will provide a daily news summary, a financial report and local sports news.

IBM signs with Syncordia. IBM has signed a three-year contract with Syncordia Corp. for private network services connecting 10 sites in five countries. The deal, which is worth \$10 million per year, shifts about 10% of IBM's European traffic to Syncordia. IBM will initially only use Syncordia to support data but will ultimately add voice and video applications. The driving factor in IBM's decision was cost.

CONTACTS



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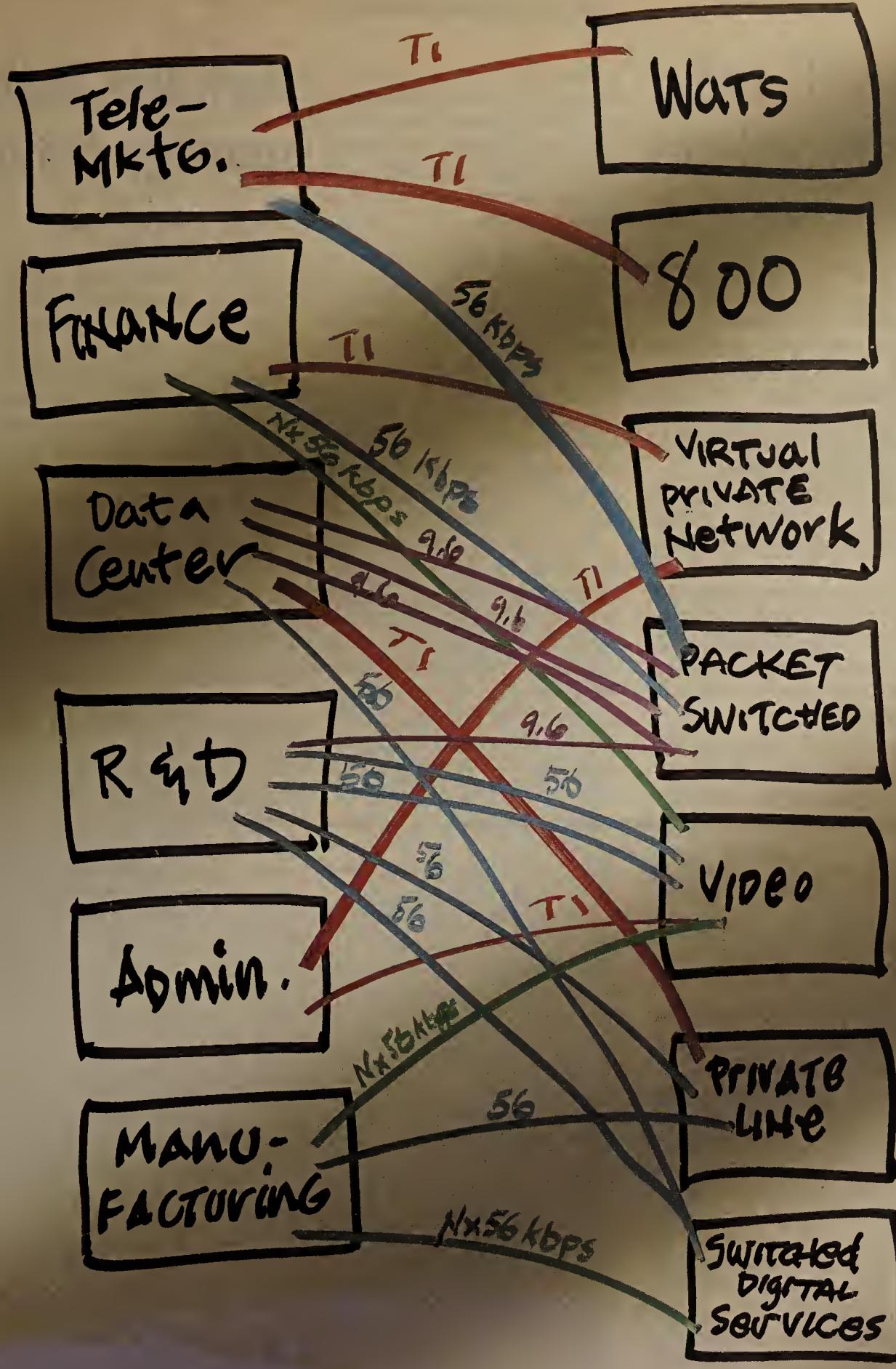
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Tariff 12 ruling will help some users but irk others

Issue of changing 800 numbers a major hurdle.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Although the FCC's recent decision to allow AT&T custom network users to make changes in their deals solved the problems of some customers, it may have created difficulties for others.

The Federal Communications Commission's revised order will now allow existing Tariff 12 customers — as well as users of other custom agreements such as Tariff 16 — to make changes to their deals. But any new customer wishing to purchase Tariff 12 and possibly any existing Tariff 12 customer wanting to switch to a new network option will now face significant hurdles.

Several users said they may be

left stranded by the decision. For example, even though National Data Corp. has been trying to switch to a new option since January, the likelihood of that occurring remains unclear. The fate of numerous resellers' attempts to purchase Option 58 of Tariff 12 also hangs in the balance.

Under tremendous pressure from users and AT&T to rethink its decision last August to freeze Tariff 12 deals, the FCC two weeks ago decided to relent. But the problem the agency faced was how to craft a rule that gave customers relief when the market circumstances that prompted the rule still existed.

The FCC last August said that AT&T is dominant in the 800-services market and, therefore,

could unfairly leverage that power to sell other services bundled into Tariff 12 deals. This is especially true because 800 numbers are not portable and users must give up their numbers to switch to another carrier.

Leveling the field

This month, the FCC reaffirmed that AT&T is dominant in 800 services. The ability to move 800 numbers between carriers is at least a year away. So, in an effort to level the playing field, the agency came up with the idea of requiring customers that want to purchase Tariff 12 deals to give up their existing 800 numbers.

In exchange, customers that had Tariff 12, Tariff 16 or contract deals in effect on April 16 (the day before the order) can bargain for any modifications they want, including new rates, new terms and the addition or deletion of different voice and data services. Since December, when the FCC first started rejecting

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StrataCom to unveil new frame relay mgmt. wares

By Michael Cooney
Senior Editor

SAN JOSE, Calif. — StrataCom, Inc. today will introduce software that gives carriers or private network users detailed management information about frame relay nets based on the company's IPX multiplexers.

The new software will work with the company's StrataView Plus network management platform to monitor the status of frame relay nets, gather data on network performance, provide error tracking and produce customizable reports on usage, throughput, congestion and other items.

The enhancement will give carriers that use the IPX to provide a frame relay service — including AT&T, BT North America, Inc., CompuServe, Inc. and WilTel — a platform from which to offer users frame relay management applications.

CompuServe and WilTel have committed to doing just that, and AT&T said it is evaluating the new capabilities. BT North America could not be reached for comment. WilTel plans to roll out management offerings based on the new software late in the third quarter as part of its WilView net management service. The other carriers have not announced service availability dates.

Analysts were high on StrataCom's enhancements.

"StrataCom is addressing the major frame relay issues — real-

time services and historical reporting of data — with one platform that will be useful to carriers and users," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "The key is that users will be able to see what their frame relay net is doing now, not in 30 days on a historical report."

Management data gathered from IPX ports will be funneled to an Informix Software, Inc. database included with the product. A spreadsheet report generation package, called WINGZ, is also included to help generate reports about net performance, for example.

An open application program interface will be provided to let carriers develop their own applications, such as those that give users a real-time, on-line view of their virtual private frame relay network. Users will be able to generate reports on the status of the link between the router or access device and the network.

"From our standpoint as a carrier, the open network management interface being offered by StrataCom is the most significant piece of this announcement," said Russ Ray, vice-president of engineering at WilTel. "It will allow us to get to market with new management products faster because it avoids the problem of having to customize everything, which is time-consuming."

StrataCom will also announce that StrataView Plus software will

now run on Digital Equipment Corp.'s DECstation 5000/25. The current version only runs on the DECstation 3100.

In addition, the system will be enhanced to provide concurrent access from multiple X terminals. That will give carriers and users a low-cost method of attaching multiple consoles to a single StrataView Plus system.

Analysts said the new management features will help users scale their networks to actual usage, determine throughput and avoid congestion. Carriers could use StrataView Plus to design and implement usage-sensitive tariffs, as well, they said.

The real benefit to users is they will be able to obtain network management and traffic information about their frame relay network for the first time, according to Ray. "In the past, network managers had to rely almost solely on complaints from end users to find out that something was up with their frame relay network."

Paul Weekes, director of information technology at Motorola, agreed. "We can't really manage the frame relay network today; we sort of have to guess at it," he said. "This next release should help us get a handle on the network." Motorola uses StrataCom IPXs at 17 U.S. locations.

The new network management features will be available in June and cost \$10,000 for nets of eight or less nodes and \$20,000 for larger nets. Existing StrataView Plus users can upgrade to the new features for \$8,000.

Senior Editor Bob Brown contributed to this story.

Pack lets IBM, HP, DEC tools manage Synoptics hub nets

By Joanne Cummings
Staff Writer

SANTA CLARA, Calif. — SynOptics Communications, Inc. is expected to unveil today software that enables its intelligent wiring hubs to be managed directly by IBM's NetView/6000, Hewlett-Packard Co.'s OpenView or Digital Equipment Corp.'s DEC Management Control Center (DECmcc) Director management systems.

The new software, called Lattis Views, gives these management systems the same level of control over hubs that previously could only be obtained using SynOptics' LattisNet Manager for Unix product, which runs on SunConnect's SunNet Manager management platform.

"This approach provides plug-and-play convenience because Lattis Views can be run as an integrated component on the user's chosen management platform," explained Bill Lanfri, SynOptics' vice-president of marketing.

Lattis Views can run on: an IBM RISC System/6000 configured with AIX NetView/6000, which is IBM's local-area network-based net management system; a DECstation 5000 or 3100 running DECmcc Director; or an HP Apollo 9000 Series 700, HP 9000 Series 800 or Sun Microsystems, Inc. SPARCstation running HP's OpenView Network Node Manager.

Based on the Open Software Foundation, Inc.'s Motif graphi-

cal user interface, Lattis Views provides a network configuration map and a series of pull-down menus that show concentrator, module- or port-level fault, performance and configuration data for LattisNet hubs.

The software includes most of LattisNet Manager's features — such as the ability to show nodes, set thresholds, and provide for node security and out-of-band management — but does not include some high-end features, such as the ability to automatically build the net topology or automatically reconfigure the hub network, a spokeswoman said.

Lattis Views provides users of the three managers with hub-level Ethernet and token-ring information on such items as module and port status, utilization, activity and diagnostics.

For Ethernet, the software also provides specific data on the number of good and bad packets as well as partition status. For token ring, Lattis Views provides a Ring View feature that enables users to review station profiles, determine station status or remove any station from the ring.

The software does not support Fiber Distributed Data Interface network management, but the spokeswoman said that support would be offered in the future. She declined to provide a time frame, however.

Available in July, Lattis Views costs \$6,995 for a single-user license.

Ascom Timeplex to unveil mux for low-end market

By Michael Cooney
Senior Editor

WOODCLIFF LAKE, N.J. — Ascom Timeplex, Inc. this week will announce a low-end feeder multiplexer designed to let users extend the reach of corporate backbones to smaller sites.

The product will round out the low end of Ascom Timeplex's Link+ family of T-1 multiplexers with an aggressively priced, intelligent mux that can be managed by the company's TimeView management system.

"It will sell for between \$4,000 and \$6,000," said Joe Gottlieb, an analyst with the META Group in Westport, Conn. "Users in remote sites don't want a costly mux to get their traffic to the backbone. This box gives them [a new] option."

The new mux will be scalable,

capable of supporting between one 56K bit/sec wide-area link up to a single full T-1 line, and from two to four local ports.

What's new

By contrast, Ascom Timeplex's current low-end mux, the microLink/2+, supports as many as four T-1s, and 16 local ports and is priced from \$8,000.

Ascom Timeplex, based here, confirmed that the new multiplexer would be announced this week but declined to provide details on its features. The company did say it could be used by customers without existing Link+ nets.

The addition of a feeder mux is a catch-up item for Ascom Timeplex, analysts said. General DataComm Industries, Inc., Network (continued on page 54)

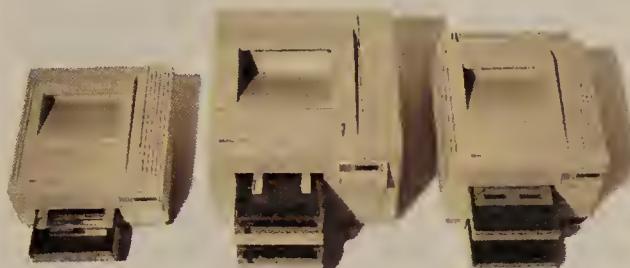


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HP unveils application for net systems management

By Jim Duffy
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. last week unveiled software that measures the processing performance and capacity of systems in a distributed, enterprise-wide network.

HP PerfView consists of two components — one that runs on HP's OpenView systems and network management console, and agents that run on systems to be monitored. Agents run under HP's Unix-based HP-UX, HP's proprietary MPE operating systems and Sun Microsystems, Inc.'s SunOS.

To use HP PerfView, systems managers first have to predefine computing performance thresholds based on what they regard as optimum response time and throughput. When a system approaches the threshold, HP PerfView triggers an alarm that warns

the manager of a potential or existing problem before performance degradation occurs.

The HP PerfView alarm is sent to a central OpenView management console as a color-coded icon. By clicking on the icon, the manager can home in on the problem area.

Once the faulty node is targeted, the systems manager can then issue commands from the OpenView console — such as launching node-specific diagnostic applications — to take corrective action before the user experiences performance degradation, according to HP.

The threshold alarm triggering technique, which HP refers to as "management by exception," is said to reduce the traffic load on the network because it obviates regular polling of a managed system by the management console. HP PerfView sets up a con-

nexion to HP OpenView only if it detects an "exception" condition.

Analysts found the management by exception feature most intriguing.

"Network managers are inundated with information," said Doug Gold, an analyst with International Data Corp. in Framingham, Mass. "[PerfView] allows managers to say, 'Until the thresholds are reached, don't bother me.'"

HP PerfView also identifies underutilized compute power and notifies the HP OpenView operator.

Future releases of HP PerfView will run on Digital Equipment Corp.'s Ultrix, IBM's AIX, Novell, Inc.'s NetWare and the Open Software Foundation, Inc.'s OSF/1 operating systems.

The central software component of PerfView is priced at \$26,000. Pricing for the intelligent agents varies depending on the size and configuration of the environment being managed. HP PerfView is slated for July availability. □

IBM to pull its OfficeVision/2

continued from page 1

pected to announce that Notes and cc:Mail will simply replace its incomplete OfficeVision/2 LAN product. It will offer this alternative as an even exchange for current users as well as all new sales.

Sources said discussions regarding IBM's use of Notes technology, such as its database replication capability, as add-ons to OS/2 have been squelched in favor of IBM's own technology.

IBM declined to comment on its OfficeVision plans, but sources briefed by the company confirmed that an announcement will likely be made in the next few weeks. Lotus officials said the technical details have been ironed out and the companies are finalizing the arrangement.

"When IBM formally announces that it is no longer developing its own OfficeVision/2 LAN product, it will more clearly define to its customers how Notes and cc:Mail fit strategically into its product line," said Greg Lazar, director of business alliances at Lotus.

Sources said IBM will develop gateways to connect the host- and minicomputer-based versions of OfficeVision with Notes and cc:Mail and will work with Lotus to integrate functions such as calendaring and directories across the two products.

OfficeVision, used by several million customers on IBM's MVS, VM and Application System/400 platforms, provides core office services such as word processing,

electronic mail, decision support, calendaring and note and document processing.

Getting AS/400 and mainframe versions of OfficeVision developed was easier for IBM because of the product base it had to work with, said Steve Randesi, chairman of Gen2 Ventures, a consulting firm in Saratoga, Calif.

"[IBM's Professional Office System] was folded into OfficeVision/VM and [IBM's Distributed Office Support System] into OfficeVision/MVS," he said. "IBM didn't really have to change things or convince users to move to those OfficeVision products. IBM started [OfficeVision/2] from the ground up, and it was a tough job."

OfficeVision was billed as the first application to be based on SAA, IBM's blueprint for application portability. Among other things, SAA calls for a consistent user interface for applications across many platforms. IBM's LAN office products will not fulfill this goal since Notes and cc:Mail are not SAA-compliant.

"IBM is sacrificing some of the cooperative processing aspects of OfficeVision with a more usable product for users," said Tom Nolle, president of CIMI Corp., a consulting firm in Voorhees, N.J. "IBM can add some of the OfficeVision intelligence in the future if users require it."

For Lotus, the agreement is another boost for Notes and cc:Mail with large corporate customers. "Customers have asked, is Notes strategic or not?" Lazar said. "Now it will be clear that Notes is strategic for IBM." □

Users explore NLM's dark side

continued from page 1

than either Novell or the database vendors are willing to admit. NLM database users face potential network crashes, processor overloads and memory management problems, they said.

"The problems are endless. People are asking for a lot of trouble," said Donald Feinberg, program director for software management strategies at Gartner Group, Inc. in Santa Clara, Calif. "People need to set expectations for these NLMs properly and understand the trade-offs that make these databases run so fast."

Database vendors have felt pressure from Novell and users to deliver versions of their products as NLMs, a new class of server applications that are tightly integrated with the network operating system but can be loaded and unloaded as needed without rebooting the server.

But that is not easy. Because NetWare does not specify how multiple applications interact on the same server, database vendors have been forced to develop their own solutions for managing memory and scheduling processor tasks — jobs usually handled by the operating system.

NLM databases can free users from running separate database servers and offer speedy performance. But if the server hardware fails, users lose not only file and print functions, but access to the database, as well. An NLM crash can also bring down the server.

To date, only four vendors have offered NLM versions of their SQL databases: Novell; Oracle, which was the first third-party vendor with an NLM offering; Gupta Technologies, Inc.; and Progress Software Corp.

In addition to Sybase's expected announcement next month, Borland International, Inc., Informix Software, Inc., XDB Systems, Inc. and Ingres Corp., an ASK company, are working on NLM versions.

"Vendors are being forced to design these NLM versions even though they know there are problems with the products," said Richard Finkelstein, president of Performance Computing, Inc., a Chicago-based consulting firm. "Vendors don't want to displease Novell or users but, ultimately, people will find out."

As a 32-bit operating system, NetWare provides a high-performance platform by avoiding the overhead incurred by many application-oriented memory and processor scheduling features found in multiuser operating systems.

NetWare does not provide a way to protect applications from running in the same memory

space, and problems can result when an NLM overwrites the source code or data from another NLM or application, causing the server to crash.

In addition, NetWare does not provide a method for scheduling server CPU time among various tasks so NLM databases can compete for server time, degrading performance or bringing applications to a grinding halt. And because NetWare does not centrally control memory usage, NLM databases must employ their own memory management schemes, which can affect the prioritization of tasks and throughput.

"I don't believe many users are aware of the risks of running database applications in an unprotected environment like NetWare. It will be a costly learning process," Finkelstein said.

"We're encouraging Novell to add more protection because it really would help," said Doug Laird, product manager in Oracle's Desktop Products Division.

Despite the potential problems, there are distinct advantages to running databases as NLMs. NetWare is the undisputed LAN standard, and many users already familiar with it have been reluctant to run databases under Unix or OS/2. Databases also run faster as NLMs under NetWare.

"We're not saying NLM databases are for everyone," said Dwight Davis, director of engineering at Novell's Database Products Division in Austin, Texas. "But NLM databases do provide a good price/performance platform for certain types of database work."

In addition, there are some solutions emerging that may lower the risk of running NLM databases. Some experts recommend using an NLM database as a prototype or development environment to build applications that could be more safely implemented on other platforms.

Another approach is to run the NLM on a separate server. Novell is even making a run-time version of NetWare available to software vendors to make this alternative more attractive.

"I believe people will want to configure SQL Server as a stand-alone database server and not try to do print and file sharing on the same server," said Stewart Schuster, vice-president of marketing at Sybase.

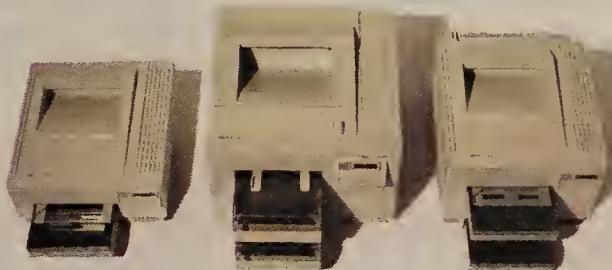
The other solution is for Novell to address some of these problems directly in NetWare. In NetWare 3.2, due at year end, Novell will offer an optional protected mode, which could slow performance but provide more stability for applications. Novell could also potentially offer a preemptive scheduling capability that would bring some order to the processor-level demands. □



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**HEWLETT
PACKARD**

Cellular nets to use IBM plan for data

continued from page 1

group that will be available to cellular service providers and equipment makers.

The participating carriers are Ameritech Mobile Communications, Inc., Bell Atlantic Mobile Systems, Contel Cellular,

Inc., GTE Mobilnet, McCaw Cellular Communications, Inc., Nynex Mobile Communications, PacTel Cellular, Southwestern Bell Mobile Systems and US West Cellular.

The carriers plan to present the specifications to the Cellular Telecommunications Industry Association and the Telecommunications Industry Association for adoption as standards.

Carrier wants new licensing plan

WASHINGTON, D.C. — Fleet Call, Inc., the second largest operator of mobile radio services in the U.S., last week asked the FCC to issue a new set of rules to speed creation of a nationwide digital radio network.

If the Federal Communications Commission grants Fleet Call's request, it would accelerate the upgrade of current analog mobile radio systems to more sophisticated digital technology. It would also encourage individual operators to join together to provide service nationwide, according to company executives.

Such digital radio systems would be able to serve more customers and pave the way for new services, including emerging personal communications service nets. Digital radio systems can carry voice, data and paging traffic.

The FCC has set aside 280 channels in the 800-MHz frequency in each U.S. ser-

vice area for analog mobile radio systems and allows operators to license only five channels at a time.

Due in part to the agency's channel limitation, mobile radio services have been limited to a small number of customers in isolated areas and the market has not blossomed as expected.

But according to Fleet Call Chairman Morgan O'Brien, allowing operators to license major blocks of channels would solve that problem. The Fleet Call petition asks the FCC to allow mobile radio operators to license blocks of 105 channels in each service area. This would make such licenses more valuable and enable operators to solicit greater amounts of capital for investment in new digital systems, he said. It would also attract operators large enough to develop a nationwide system, he explained.

— Anita Taff

How To Extend Your IP Network Without Overextending Your Budget.

The book cover is red with white text. The title 'DIAL-UP INTERNETWORKING' is prominently displayed in large, bold, sans-serif letters. Below the title, a subtitle reads 'The Role of Dial-Up Connectivity in Enterprise Internetworking'. At the bottom, it says 'January 1992' and 'By Infonetics Research, Inc.' There is also a small logo for Infonetics Research, Inc. at the bottom left.

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TELEBIT
First in Dial-Up Networking.

Several carriers will begin field trials of the cellular data technology in California this summer, according to Nick Kauser, senior vice-president and chief technology officer at McCaw, the nation's largest cellular carrier. The IBM Information Network will be tied into the trial nets to explore possible combined value-added network and cellular services.

As much as 30% of cellular network traffic could be data by the turn of the century, Kauser said, noting that the amount of cellular data traffic is currently infinitesimal.

The Celluplan II technology supports speeds up to 19.2K bit/sec, which is higher than those offered by existing wireless data communications service providers, such as ARDIS Co., which runs ARDISNET, the nation's largest mobile data network. ARDIS offers speeds up to 4.8K bit/sec but plans to boost that to 19.2K bit/sec.

Shoehorning data

Sue Swenson, president of PacTel Cellular, said Celluplan II is attractive because it "will let us shoehorn data into existing voice channels without putting the squeeze on our current customers or our network capacity."

Cellular carriers already can handle data, but they need to dedicate channels to it, which is expensive. Also, the existing pricing structure for voice, basically a fixed monthly fee and cost-per-minute charge, does not work well for data calls.

A likely pricing structure for data services will include a fixed monthly fee per user, device or both, as well as a cost per number of packets transmitted, according to Gary Weis, vice-president of networking and technology at Sears Technology Services, Inc. (STS), the technology arm of Sears, Roebuck and Co. STS will be the first major trial user of the technology (see "Carrier wants new licensing plan," this page).

Robert Rosenberg, president of Insight Research Corp., a Livingston, N.J., market research firm, said there is tremendous untapped potential in the market for tying remote users into corporate nets. "We could be looking at the start of a multibillion-dollar market," he said.

In addition to business applications, cellular data services could support new consumer services, such as information services for travelers. □

Sears to use new cellular data services

SANTA CLARA, Calif. — Network executives at Sears, Roebuck and Co. have no shortage for what to do with cellular data services.

Sears is looking at cellular data to let the field technicians who maintain its corporate network communicate with its data centers. The retailer is also looking at offering cellular data services to customers as an access option to its value-added network, provided by Sears Communications Co.

"We think [cellular data services] will provide Sears with new options to enhance our competitiveness," said Gary Weis, vice-president of networking and technology for Sears Technology Services (STS), Inc., which serves Sears' internal users. STS began looking at wireless communications about two years ago and will test cellular data services based on the IBM Celluplan II technology this summer.

One primary application STS is examining is to give field technicians laptop personal computers equipped with voice handsets and radio frequency modems. That would enable them to access host computers and receive electronic messages on the road. STS technicians today have to lug laptop computers, beepers and cellular phones, none of which are integrated.

STS also is looking at giving delivery trucks access to cellular data services in order to improve Sears' distribution business, Weis said. "Think of yourself as a Sears customer waiting for the delivery of an appliance," he said. "What you'd really like is for Sears to say, 'I'll deliver it within an hour and I'll keep in touch to let you know if I'm having any difficulty.' "

STS will also look to cellular technology to support sales and marketing personnel off-site.

— Bob Brown

Microsoft, DEC to align architectures

continued from page 1

Open Services Architecture (WOSA).

Ultimately, this will result in the establishment of common application program interfaces (API) that will enable a single application to run over Windows NT and, with minor modification, DEC's NAS-compliant operating systems, including VMS and OSF/1. It will also improve interoperability by helping to ensure that Windows client applications could use net-resident NAS services and applications.

Alpha is DEC's 64-bit RISC-based hardware architecture and the ultimate successor to its bread-and-butter VAX design, while Windows NT is a 32-bit operating system that includes networking and database access features. Alpha and Windows

NT are technology components of the Advanced Computing Environment (ACE) initiative, a year-old consortium defining an industry-standard, high-performance desktop computing platform.

Microsoft and DEC's expanded joint development agreement and ACE participation is viewed as an effort to rival Taligent, Inc., the firm Apple Computer, Inc. and IBM formed to create an advanced operating system for IBM's RISC architecture. Microsoft officials denied the connection.

"[There's] a trend in computing to downsize; we are just responding to that trend, not anything IBM or Apple may have done," said Carl Stork, director of Microsoft's Windows NT business development.

A key component of the Windows NT/Alpha union is to create a common set of APIs for DEC's NAS and Microsoft's (continued on page 54)



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Nov. 9, 1989 - The Berlin Wall, the world's symbolic communication barrier, crumbles under the resounding cries for freedom.

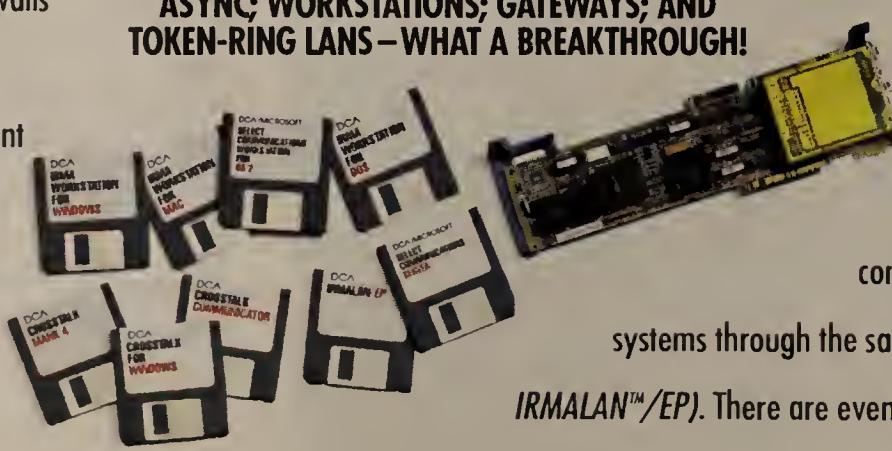
IMAGINE THERE WERE PEOPLE COUNTING COME TO THINK

Okay, so the barrier between micros and mainframes is hardly a Berlin Wall. Still, you have to admit, it hasn't exactly helped the free flow of information. For that matter, neither have the walls between Windows™ DOS, Mac™ and OS/2®. Not to mention the ones between LANs and hosts, different LAN topologies... whatever.

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ON YOU FOR A WAY TO COMMUNICATE. OF IT, THERE ARE.

change your PC architecture, cabling and speeds without having to buy a new board (*IRMAtrac™* and *MacIRMAtrac™*). As for async communications, well, you won't find a more "award-winning" family of software than ours (*Crosstalk®*).

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UDS brings more to the table in the V.32 bis modem game



	Max Thruput	Rack-Mountable	V.25 bis Autodial	Dial Backup	Remote Config.	Call Security	LCD Display
UDS V.3229	57.6K	●	●	●	●	●	●
Digicom 9624E+	38.4K	●	●	●		●	
Hayes Ultra 144	38.4K		●				
Microcom QX/4232 bis	38.4K	●			●		
U.S. Robotics Courier V.32 bis	38.4K	●					
Telebit T3000	57.6K	●			●	●	

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Modems that comply with the CCITT V.32 bis recommendation (and there are lots of them) share some common characteristics: 14.4 kbps basic rate, with compressible automatic fallback speeds; V.42 bis and MNP® level 5 data compression; sync or async full-duplex operation over two- or four-wire circuits and Hayes "AT" auto-dialing.

As these similarities drive value-conscious modem buyers to look beyond the common features, the search for added performance advantages brings them to the UDS V.3229.

In addition to the "standards," UDS offers a suite of features—automatic dial back-up, remote configuration capability, call security etc.—that is simply not available in competitive models.

If you're a modem buyer who understands that there's more to value than just price, UDS will happily rig the V.32 bis game in your favor.

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DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

"The data communications industry today is where the automobile [industry] was in World War I."

Peter Beck
Chairman and chief executive officer
Digital Access Corp.
Reston, Va.

Discussing the state of data communications technology vs. the coming video networking revolution

Data Packets

McDATA Corp.'s Link-Master 7100 controllers last week were certified by the U.S. government's General Services Administration as compliant with the Government Open Systems Interconnection Profile.

The controller is now included under the GSA Automatic Data Processing Price-list contract, which outlines the prices government agencies may pay for the controller. This enables the agencies to purchase the 7100 without taking costly administrative and negotiator steps.

GSA prices for the LinkMaster 7100 will run between \$2,606 and \$13,471.

Digital Access Corp. of Reston, Va., next week will announce a new leasing program that will let users package any vendor's video coder/decoder with the firm's Fracdial inverse multiplexer and have Digital Access finance the deal.

The program is a multimillion-dollar leasing package that will help expand the video networking market, according to Peter Beck, Digital Access' chairman and chief executive officer.

"We'll work with anyone's equipment," he said.

The APPC Server software re-

Motorola Codex releases high-speed modem line

Models handle bandwidth-intensive applications.

By Jim Duffy
Senior Editor

MANSFIELD, Mass. — Motorola Codex has unveiled a series of dial-up and leased-line modems that incorporate proprietary technology for high-speed file-transfer and other bandwidth-intensive applications.

The 326XFAST series includes Motorola Codex's homegrown implementation of V.fast technology. V.fast is a proposed CCITT standard for synchronous modulation and data compression that makes it possible to support 24K bit/sec full-duplex synchronous and 115.2K bit/sec asynchronous transmissions over voice-grade lines, said David McNamara, Motorola Codex strategic marketing manager.

This is achieved by specifying use of 4- to 7.5-bit symbols and transmission rates of 2,400, 2,743, 2,954 or 3,200 symbols per second. Thus, for synchronous transmissions, the V.fast modems can achieve throughput of 9.6K to 24K bit/sec. For asynchronous transmission, data

compression, combined with the symbol and symbol transmission specifications, can produce throughput of 115.2K bit/sec, according to the company.

Without V.fast, synchronous transmissions are typically limited to 19.2K bit/sec, McNamara said, while asynchronous transmissions with compression usually top out at 38.4K bit/sec.

Motorola Codex is positioning the 326XFAST line as a less expensive alternative to leased lines for synchronous transmissions and switched 56K bit/sec circuits for asynchronous traffic, McNamara explained.

Although 326XFAST does not comply with the CCITT V.fast standard, the firm will upgrade 326XFAST users at no charge once the standard is completed in a year or two, he said. Motorola Codex contributed its V.fast technology to the Consultative Committee on International Telephony and Telegraphy for incorporation into the V.fast standard.

There are four models in the

(continued on page 14)

Rabbit rolls out APPC DOS package

By Michael Cooney
Senior Editor

MALVERN, Pa. — Rabbit Software Corp. last week jumped into the peer-to-peer communications fray with new DOS-based APPC software for its Open Advantage gateway.

The new Open Advantage APPC Server 1.0 software will let DOS users run distributed applications across IBM Systems Network Architecture nets.

The APPC Server includes Rabbit's 3270 emulation software, which allows users to access existing 3270 applications and Advanced Program-to-Program Communications applications on the host simultaneously. The feature also lets users migrate from 3270 to APPC applications.

The APPC Server software re-

sides on Rabbit's Open Advantage Gateway Release 5.0, which provides SNA/Synchronous Data Link Control or token-ring links to as many as eight IBM mainframes. It also supports Novell, Inc. NetWare and IBM Network Basic I/O System local-area nets.

The new software uses IBM's high-level interface to APPC — Common Programming Interface for Communications (CPI-C) — as its programming interface.

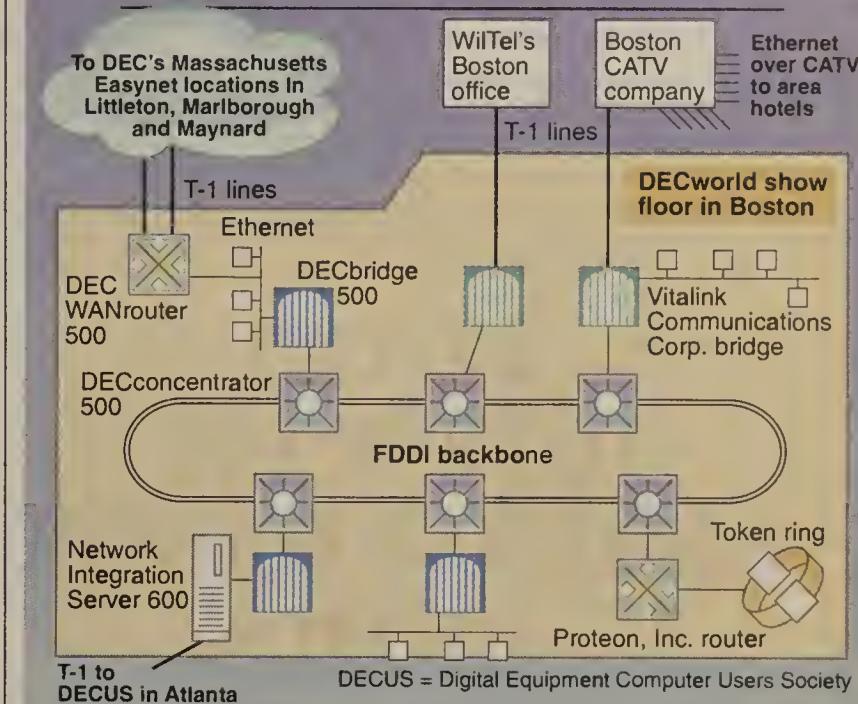
"The gateway becomes an APPC application server supporting up to 32 logical unit attachments," said Pete Bowman, Rabbit's Open Advantage department manager. "APPC allows multiple conversations to take place over the same logical unit, so many more than 32 conversations could be going on at once."

Analysts said the new software will help Rabbit compete against the SNA gateway market leaders.

"Rabbit has been playing catch up with Attachmate [Corp.] and DCA in the DOS communications world," said Larry DeBoever, managing director of Tucker/DeBoever Technologies in

(continued on page 20)

DECworld ties to the outside world



The DECworld '92 network will support 5 T-1 circuits to remote sites, including the DECUS show in Atlanta and a Boston CATV company, which will disseminate show information to area hotels.

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

DEC to keep security tight at DECworld

Vendor's new security offerings are part of master plan to keep hackers, viruses out of show net.

By Jim Duffy
Senior Editor

BOSTON — Security — net security, that is — will be tight at the World Trade Center here this week as Digital Equipment Corp. kicks off DECworld '92.

This year, DEC is taking extra precautions to ensure that the DECworld network, which will connect roughly 1,000 devices and be accessible to about 30,000 people, is not susceptible to viruses or corrupted software. The firm will closely scrutinize what attendees bring into and take from the show, as well as deploy some new products for monitoring and safeguarding the net.

The emphasis on security is due to the recent spate of computer network infiltration by hackers, who brazenly challenge net administrators to thwart their assault. There have also been instances of late where customers received corrupted software from their vendors.

"We're a little nervous about [intrusion] only because it's something we haven't faced before," said Deborah Nicholls, DECworld chairwoman. "But we believe we'll have excellent security in place."

Because the variety of connec-

tions to and from the DECworld network will present a veritable smorgasbord for the hungry hacker, the preoccupation with security is understandable. The task will also be a demanding one since DECworld runs for three weeks, from April 27 to May 15.

The backbone for the net, which will be a 100M bit/sec Fiber Distributed Data Interface local-area network, will include 23 DECconcentrator 500s as well as Ethernet-to-FDDI bridges that will connect about 50 Ethernet LAN segments to the backbone. Bridges will also connect the Ethernet LANs to each other.

In all, DEC will have 50 bridges and seven routers on the DECworld network.

Five T-1 circuits will tie remote sites to the show floor, including one that will link to a cable television facility here (see graphic, this page). The CATV company will send DECworld information over CATV lines to interactive multimedia kiosks located in area hotels.

Another T-1 will link the net to WilTel's main office here for access to the carrier's WilPak frame relay service, which will support an imaging and videoconferenc-

(continued on page 14)

DEC to keep security tight at DECworld

continued from page 13

ing demonstration between DECworld and WilTel's Tulsa, Okla., headquarters.

Also, 100 VMS, Ultrix and OS/2 LAN servers will run DEC's Pathworks network operating system to provide file and print services and electronic mail, as well as DECnet and Transmission Control Protocol/Internet Protocol transport for about 200 client workstations used by exhibitors.

Managing the net will give DEC an op-

portunity to show off Version 1.2 of its DEC Management Control Center (DECmcc) Director network and systems management software, which debuted two weeks ago ("DEC moves toward opening up its management system," NW, April 20). The software will run on a DEC VAXstation 4000 Model 60 and display a topological map of the show floor.

The size and scope of the DECworld network prompted DEC to begin its stepped-up security measures in January. During a product demonstration staging at an Andover, Mass., facility, DEC staffers and visi-

tors were prohibited from bringing software disks into the staging areas or leaving the building with them.

That practice will be carried forward this week. Unlike previous shows, attendees will not be allowed to enter or leave with software disks or magnetic tapes. Also, third-party exhibitors will not be able to load software onto their equipment on the DECworld floor. All software was pre-loaded at the staging site in Andover.

DEC will also deploy some of its new products at the show to detect and counteract viruses and software errors. The new

products will run on VMS, Ultrix and Sun Microsystems, Inc. SunOS systems.

Those products will include new versions of the company's DECinspect Security Reporting Facility and DECinspect Compliance Manager for VMS applications, as well as Intrusion Detector for VMS, which is a new application. Also on display will be the new DECinspect Compliance Manager for Ultrix and SunOS platforms.

DECinspect Security Reporting Facility for VMS collects and compiles security information from networked VMS, Ultrix and SunOS systems. It runs on at least one VMS system in a network and allows net managers to monitor and maintain a secure, intrusion-proof environment for those systems.

DECinspect Compliance Manager runs on every VMS, Ultrix and SunOS system in the network. It periodically sends information to the Security Reporting Facility concerning whether each system complies with predefined security parameters. If the system does not meet all the parameters, DECinspect Compliance Manager allows the network manager to bring the system into compliance through software scripts.

DECinspect Intrusion Detector for VMS also runs on every VMS system in the network. It sends high-priority alerts to the DECinspect Security Reporting Facility console when it detects suspicious activity. It also invokes countermeasures, such as terminating the hostile process, disabling malicious user accounts and resetting disabled alarms.

DEC will also run the DECmcc Management Station for Ultrix (MSU) on a VAXstation 5000 Model 200 to display a configuration map of IP nodes and devices managed via the Simple Network Management Protocol. Version 1.2 of DECmcc Director for VMS will perform the bulk of the management tasks, however.

"The [MSU] may end up redundant," said Michael Lyons, network consultant for DEC's Information Services Group. "We wanted an alternative [in order] to have two things to look at." □

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Motorola Codex rolls out modem line

continued from page 13

326XFAST series: the \$1,395 3260FAST, a stand-alone V.32/V.32bis dial-up modem; the \$1,645 3263FAST, a rack-mountable dial-up and leased-line device; the \$1,695 3261FAST, a stand-alone dial-up and leased-line modem; and the \$2,395 3262FAST, a dual-modem rack-mountable card. All models will be available in the U.S. and Canada next month.

Analysts say that once the CCITT V.fast standard is stable, V.fast modems will follow the path of its low-priced, thin-margin predecessors.

"Once the standard is adopted, you'll get lower tier [manufacturers] offering the same type of device a lot cheaper," said Curtis Price, an analyst at International Data Corp. in Framingham, Mass. "Over the long term, the lower tier vendors will erode the market."

Nonetheless, having V.fast on the market will appeal to banking and retail users who need that type of throughput and might develop more applications to take advantage of it, Price said. □

LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

"FDDI over copper will eliminate two of the obstacles for bringing FDDI to the desk: dependency on fiber-optic cable and a high price tag."

Paul Callahan
Senior analyst
Forrester Research, Inc.
Cambridge, Mass.

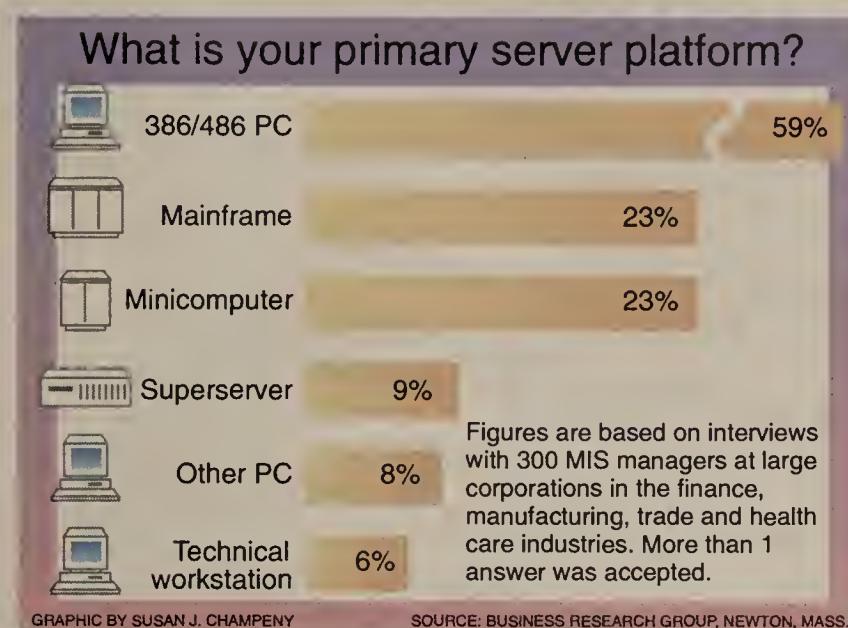
Netnotes

A Fiber Distributed Data Interface adapter for IBM Personal System/2s and RISC System/6000s is in the works at **Network Peripherals, Inc.** of Milpitas, Calif. Due next month, the Micro Channel Architecture card will cost between \$2,695 and \$4,995.

Intel Corp.'s LANSight Support local-area network node management software now works with LAN Manager and LAN Server nets. Rolled out last week, the \$395 package lets net managers control and configure personal computers on the LAN.

Automated Design Systems, Inc. of Atlanta has shipped its Windows Workstation 4.1 management utilities. Starting at \$995 for 10 users, Windows Workstation 4.1 offers network managers control and auditing capabilities for Microsoft Corp. Windows personal computers on a local-area net. It lets administrators do such things as password-protect Windows' desktops and distribute software.

LAN Directory, software that helps network managers track application license compliance on a NetWare network, recently shipped with The Frye Utilities for Networks from **Frye Computer Systems, Inc.** of Boston. The package costs \$495. □



TI unveils new Unix mini with key server attributes

Offers support for multiprocessing and NetWare.

By Caryn Gillooly
Senior Editor

AUSTIN, Texas — Texas Instruments, Inc. last week brought out a Unix minicomputer that offers multiprocessing capabilities and can act as a server for as many as 1,000 clients.

The new Model 1500 MP 68040, based on the new Motorola, Inc. 33-MHz 68040 processor, is a scalable machine that provides Novell, Inc. NetWare support and includes other server-oriented features.

Ian McMurray, marketing manager for the Computer Systems and Services business of TI's Information Technology Group here, said the 1500 MP model is a fulfillment of the company's previously announced commitment to provide customers with what it calls an Investment Protection Architecture.

Investment Protection Architecture is TI's plan to allow customers to upgrade machines by adding more processors instead of swapping out machines. The latest addition to the MP line can support as many as 16 processors.

"We're telling our customers that this may be the last computer they'll ever have to buy," McMurray said.

NetWare support

The new server runs TI's Unix System V operating system, which is compatible with AT&T Unix System V. And in response to customer demand, the company has added NetWare support, allowing the TI machine to act as the server for a NetWare local-

area network.

TI has also added a transaction logging system and disk-mirroring capabilities to its operating system for added fault tolerance.

McMurray pointed out, however, that the operating system already provides symmetric multiprocessing capabilities, giving users a fairly high degree of fault tolerance. With symmetric multiprocessing, if one processor be-

“We're telling our customers that this may be the last computer they'll have to buy.”



comes inoperable, another automatically assumes the additional processing load.

Accommodating the 68040
The new machine is also one of the first to house the new 68040 processor, which is three times more powerful than previous MP processors, according to McMurray.

"[With these features] we've created an environment more appropriate [to act] as a server," he said.

The 1500 MP 68040 is available now in seven- and 16-slot chassis models. Its pricing starts at \$29,250 and \$59,000, respectively. □

IBM offers support for 16M bit over UTP

Introduces Token-Ring hubbing device, filters for LAN interface cards supporting lower cost wire.

By Caryn Gillooly
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — IBM last week introduced a new Token-Ring hubbing device and filters for its local-area network interface cards that make it possible to support 16M bit/sec transmissions over unshielded twisted-pair wiring.

Previously, IBM's 16M bit/sec Token-Ring products required more expensive shielded twisted-pair wire. Only its 4M bit/sec LAN products could be used with unshielded wire. "IBM still feels [shielded twisted pair] is the best cable for data and other communications, but customers demanded [shielded and unshielded

twisted-pair support]," said Curt Dunbar, LAN products planning manager at IBM's Communications Systems division here.

Included in the expected announcement ("IBM execs detail firm's LAN course for the '90s," NW, April 13) was the new fixed-port 8230 Token-Ring Controlled Access Unit (CAU) Model 2, a new 16/4 Unshielded Media Lobe Attachment Module (LAM) and filters for the new LAM and individual workstation interface cards.

The new 8230 CAU, like the firm's existing CAU, is an intelligent hub that can support as many as four LAMs. The new LAM (continued on page 54)

D-Tech Group to unwrap low-end LAN mgmt. tool

TULSA, Okla. — The D-Tech Group early next month is expected to bring out a low-end, network operating system-specific version of its existing Heaven Nodes network management software.

The new Heaven Nodes Light gives local-area network administrators automatic inventory, as well as facilities for configuration, workstation software and cable and connection management in one low-cost software package.

According to Paul Siegerist, president of D-Tech, based here, Heaven Nodes Light is a subset of the Heaven Nodes product but does not include some of the higher end features, such as management of Internet Protocol addresses and third-party databases.

Heaven Nodes Light is Microsoft Corp. Windows-based software that resides on the network file server. When users log on to the server, the software automatically records the client's network address and other logon information.

Once the nodes are discovered, the administrator can use the software to scan each work-

station for configuration data, such as the network interface cards employed and their serial numbers. The product can also determine what local application programs are running, including which version, and report how much extended and expanded memory is available within the workstation.

Heaven Nodes Light automatically stores the data it gathers in a server-resident database. Using this information, the software will then send an alert to the administrator when it detects a hardware or software configuration change at the workstation.

Unlike many existing LAN management packs, Heaven Nodes Light also provides virus protection by initializing a checksum on all workstation-based executable files.

Heaven Nodes Light, unlike Heaven Nodes, is network operating system-specific. There will be versions for Banyan Systems, Inc. VINES, Microsoft LAN Manager and Novell, Inc. NetWare LANs.

The software will be available June 1 and cost \$495 for 100 nodes and \$250 for each 50-node increment up to a maximum of 250 nodes. □

BEST UNIX SERVER PRICE-PERFORMANCE

1. Sun SPARCserver 690MP
\$8,854 per tps-A 95.41 tps-A
2. Bull DPX/2 384
\$9,902 per tps-A 63.85 tps-A
3. Data General AViiON 5225
\$11,498 per tps-A 50.80 tps-A
4. HP 9000 Series 817S
\$11,830 per tps-A 51.20 tps-A
5. IBM RS6000/560
\$12,671 per tps-A 72.00 tps-A
6. AT&T/NCR StarServer E
\$14,520 per tps-A 24.84 tps-A
7. Sequent Symmetry S2000/700
\$14,662 per tps-A 168.91 tps-A
8. Unisys U6000/55
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On March 6, 1992 the Transaction Processing Performance Council published TPC-A benchmarks for 38 UNIX servers. This list represents each vendor's best price-performance server.

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 **Sun Microsystems**
Computer Corporation

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INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

"We see more management [capabilities] in the hub. We're focusing on turning this network infrastructure into something that gets closer to managing itself."

Bill Lanfri
Vice-president of marketing
SynOptics Communications, Inc.
Santa Clara, Calif.

Link Notes

Telebit Corp. has announced two new versions of its NetBlazer dial-up Transmission Control Protocol/Internet Protocol router.

The NetBlazer 40 is twice as fast as Telebit's first-generation NetBlazer model, the company said. It has seven internal slots and can support as many as 26 asynchronous ports at speeds up to 57.6K bit/sec and any combination of up to three Ethernet or token-ring local-area networks. Users can exchange eight asynchronous ports for one synchronous port running at 56K or 64K bit/sec.

The NetBlazer ST has three internal slots and can support as many as 10 asynchronous ports at 57.6K bit/sec one synchronous port at 56K or 64K bit/sec and one token-ring or Ethernet LAN.

Prices for the NetBlazer 40 start at \$5,198. The NetBlazer ST's prices start at \$2,999. Both products are available now.

Armatek, Inc. has introduced a wireless alternative to linking local-area networks via expensive T-1 and 56K bit/sec lines.

Armatek's EasySPAN wire-
(continued on page 20)

CrossComm pack boosts ILAN router's SNA support

Provides faster, more reliable SNA transport.

By Maureen Molloy
Staff Writer

MARLBOROUGH, Mass. — CrossComm Corp. last week announced software for its ILAN bridge/router that will enable users to more efficiently transport IBM Systems Network Architecture protocols through LAN internetworks.

The Protocol Independent Routing (PIR) software taps the capabilities of the ILAN bridge/router's recently redesigned architecture and its routing algorithm to more quickly and reliably transport IBM SNA traffic and token-ring local-area network traffic across an internetwork ("ILAN router to get key SNA support," NW, March 9).

The PIR software supports Synchronous Data Link Control, IBM's Network Basic I/O System and binary synchronous traffic without encapsulation. Other router vendors use a Transmission Control Protocol/Internet

Protocol encapsulation scheme to handle SNA traffic, resulting in additional overhead.

PIR is also equipped with a feature that enables time-sensitive IBM protocols to be prioritized so they can traverse the internet ahead of other traffic, thus improving response time. A load-balancing capability is also provided to further optimize network throughput.

The PIR software uses ILAN's new hardware-based Address Processor & Directory engine to glean detailed information about devices on the internetwork, including their media access control (MAC) and network address, and — if applicable — a NET-BIOS name or TCP/IP address.

Earlier versions of ILAN maintained port number and MAC-layer address information on each device but not net addresses, which are essential in order to find the most efficient path

(continued on page 20)

Cisco adds support for AppleTalk zones in router

MENLO PARK, Calif. — Cisco Systems, Inc. last week announced a filtering capability on its line of bridge/routers that will enable users to filter data according to Apple Computer, Inc. AppleTalk network zones.

Zone filtering simplifies network management by taking advantage of the logical areas into which an AppleTalk internetwork is divided, eliminating the need to manually enter separate addresses to the bridge/router for each device or network segment.

In traditional internets, where devices and subnets are assigned individual addresses but are not divided into logical groups — such as engineering, payroll and MIS departments — a net administrator uses a cumbersome and time-consuming manual process. That procedure informs the router of each node's network number as well as which subnets each end user may access.

With zone filtering, an administrator can use the AppleTalk zones already set up and, via a

single command, permit or deny a device access to an entire AppleTalk zone.

For instance, if a new node, such as a laser printer, is added within an existing zone, it is available to any user who already has access to that zone.

In addition, with zone filtering, security breaches are less likely to occur. That is because once a device on which key data resides is placed within a restricted zone, that information is automatically safeguarded from unauthorized access.

The new capability also enables a user to divide two departments into distinct zones separated by a third shared zone containing several servers. Neither department can access the other directly, but each, nonetheless, can retrieve information from the file servers in the shared zone.

The zone filtering feature is available free of charge with Cisco's Release 9.0 router software, which begins shipping today. □

Fujitsu deploys routers to cure ailing internet



Fujitsu upgraded its unwieldy and sluggish nationwide bridged network with routers, a move that vastly improved the internet's performance and reliability.

GRAPHIC BY SUSAN SLATER

SOURCE: FUJITSU AMERICA, INC., SAN JOSE

Routers rescue user's bridged LAN internet

Major migration should save Fujitsu's nationwide LAN internet from collapse, reduce WAN costs.

By Maureen Molloy
Staff Writer

SAN JOSE, Calif. — Faced with the imminent collapse of its huge bridged internetwork, Fujitsu America, Inc. has embarked on a migration to routers, a move that will stabilize the internet and significantly reduce wide-area network costs.

Early last fall, Fujitsu's nationwide local-area internetwork had grown so large it was on the brink of collapse. Users at numerous sites complained of woefully poor response times and lost data, while others periodically suffered complete connectivity loss.

"The throughput on the internet was abhorrent, which led to utterly unacceptable network performance," said Craig Fulgham, Fujitsu's network engineer. "We had to quickly redesign the network before it became completely crippled."

According to Fulgham, the key remedy has been to migrate to a router-based net, which will allow him to manage traffic as well as provide congestion control and load balancing throughout the internetwork.

"It became readily apparent that we should have gone to routing long ago and that we needed to segment some of our hub sites

into their own distinct networks and be able to route between them," he said.

The Fujitsu network consisted of more than 5,000 nodes on Ethernet segments nationwide that were bridged using 3Com Corp. NETBuilder bridges. Essentially, the extended LAN was a single network.

"Typically, you can bridge up to seven different LAN segments and still retain good performance," Fulgham said. "Our network consisted of 27 interconnected segments."

Bridges provide only limited segmentation and pass data intended for a remote node to all bridges in the network. In addition, bridges are not addressable, which often causes periodic broadcast storms that flood the network.

Furthermore, bridges have little flow control capabilities and, thus, are ill suited for accommodating excessive traffic loads. Consequently, the buffers on many would frequently overload, forcing them to drop incoming packets and creating an inordinate number of retransmissions.

The company's strategy to combat the problem entailed replacing most of the network's bridges with routers, which can

(continued on page 20)



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Routers rescue user's bridged LAN internet *continued from page 17*

partition networks and provide better traffic management via congestion control, alternate routing and load-balancing capabilities.

Fulgham developed a star-based topology where Wellfleet Communications, Inc. Feeder Node bridge/routers at each of Fujitsu's 12 remote sites are linked to a Wellfleet Link Node bridge/router at one of four hub sites.

The hub sites are then linked to a 36-port Wellfleet Concentrator Node bridge/router at headquarters here (see graphic, page 17).

"The more elegant solution would have been to implement redundant paths and the [Open Shortest Path First] routing protocol, but we're under budget constraints and this was the best we could do," he said. "It's been working efficiently nonetheless."

Network performance and reliability have since been ameliorated, and the company expects to slash by two-thirds the

amount of traffic flowing across the company's WAN by reducing overhead packets. The conversion is expected to be completed by the end of the month.

Coupled with the exponential savings on wide-area line costs resulting from the reduction in WAN traffic, the new network topology will also increase end-user productivity, according to Fulgham.

"Only real data destined for an end user will be put onto the WAN, not LAN chatter," he said. "The data [arrives] where it needs to be the first time and no longer requires numerous retransmissions."

Fulgham also plans to add support for Apple Computer, Inc. AppleTalk, Digital Equipment Corp. DECnet, Novell, Inc. Internetwork Packet Exchange (IPX), the Transmission Control Protocol/Internet Protocol, X.25 and Xerox Corp.'s Xerox Network Systems as well as two proprietary Fujitsu protocols.

"The routers are managing our traffic loads nicely," Fulgham said. "Because they cleanly partition traffic, local traffic remains local." Not only does traffic stay local, but associated problems do, as well, he added. □

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articles from some of the leading experts in the communications industry. The series will give you valuable insights into the trends and issues that are shaping networking in the 1990s. To receive your free set, please call today.

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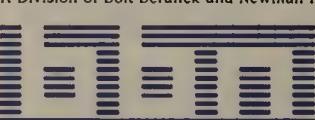
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Don't let a vendor dazzle you with next year's standards. While standards are important,

CrossComm boosts ILAN's SNA support

continued from page 17

through the internet.

In addition, CrossComm's routing algorithm, based on the Shortest Path First family of routing algorithms, works in conjunction with PIR and improves ILAN's performance and rerouting capabilities for IBM traffic by giving the bridge/router the ability to route around failed links in less than 10 seconds.

With the new architecture, ILAN bridge/routers can now keep tables on which devices are attached to what networks.

The new software feature package costs \$950 and will be available in June. □

Link Notes

continued from page 17

less technology enables users to connect Ethernet, token-ring and Arcnet networks that are less than a mile apart. It is designed to link buildings in a campus environment that have a line of sight between them, but it can also be used without line of sight at distances of less than 200 feet.

The product consists of network interface cards for each LAN file server, a radio transceiver unit, a DC power unit, network monitoring software, mounting hardware and a user manual. EasySPAN is expected to be available in July and is priced depending on the number of LANs that need to be interconnected. Linking two LANs costs about \$5,000, with each additional LAN link priced at \$2,500. □

Rabbit rolls out new APPC pack for DOS

continued from page 13

Norwalk, Conn. "But the CPI-C and LU 6.2 support will give Rabbit a step up."

Next week, Rabbit will enhance the Open Advantage gateway by adding a "smart pool" feature that lets users with many gateways gather them logically as one pool of resources and balance the data traffic load among the pooled gateways so no one is overburdened.

Rabbit will also introduce OS/2 support for the Open Advantage gateway in the next two months, according to Charles Robins, Rabbit's senior vice-president of technology.

Open Advantage APPC Server for DOS costs \$995 and is available now. The Open Advantage gateway is priced from \$1,395 to \$4,290, depending on configuration. □

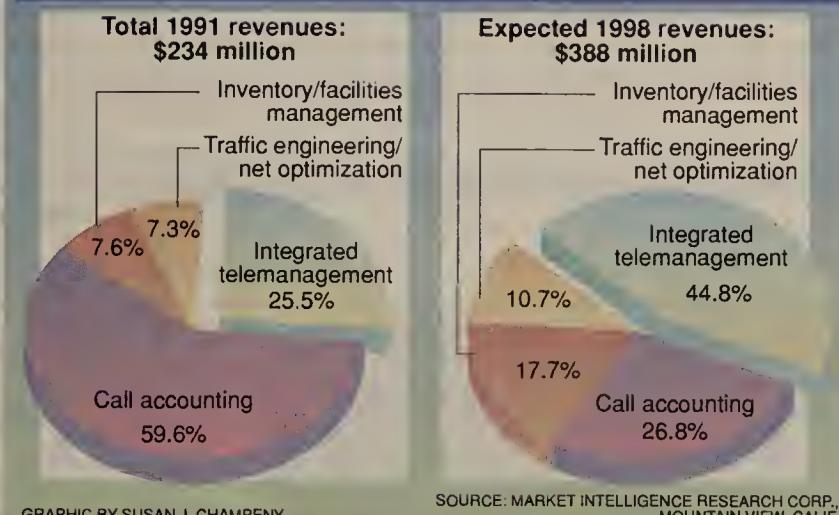
GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

Sprint Corp. last week said it will become the first major long-distance carrier to produce its bills and remittance envelopes on recycled paper. Sprint expects to use more than 105 tons of recycled paper monthly.

Moving to integrated telemanagement software, systems and services



GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: MARKET INTELLIGENCE RESEARCH CORP., MOUNTAIN VIEW, CALIF.

Carrier airs network management system

Southwestern Bell offering provides for everything from service provisioning to call volume analysis.

By Bob Wallace
Senior Editor

ST. LOUIS — Southwestern Bell Telephone Co. is testing a new network management system that will enable customers to access its computers to keep tabs on service orders, repair reports and billing information.

The Customer Network Administration hardware and software will provide users with a single interface to nine applications on about 50 computer systems scattered throughout Southwestern Bell Telephone's five-state region.

"Customer Network Administration lets customers integrate the administrative tasks associated with service provisioning, repair, test management, call volume analysis and network management," said Kevin Haberberger, Southwestern Bell Telephone's Customer Network Administration product development manager.

Customers can use a variety of devices to access the system, including Sun Microsystems, Inc. workstations running the X Win-

for all sites in Southwestern Bell Corp.'s territory.

The system's bill inquiry capability enables users to view service bills up to six-months-old and access bills as much as a year old, Haberberger said. This enables the company to verify a wide variety of charges. Currently, users must call a Southwestern Bell Telephone customer service center or manually review old paper bills.

Traffic reports that would typically be mailed to customers can also be viewed on-line.



Customer Network Administration's trouble ticket creation capability enables users to issue trouble tickets, discover whether a particular circuit has had problems and view the trouble ticket's history of any circuit, Haberberger said.

The bill inquiry capability enables users to view service bills up to six months.



dow System software, personal computers running Microsoft Corp. Windows 3.0 and X Windows, PCs running IBM OS/2 and Presentation Manager, Apple Computer, Inc. Macintoshes or ASCII terminals. The system is accessed using 9.6K bit/sec asynchronous dial-up links.

The system's applications

Once the link is established, users can examine previous bills, open trouble tickets, issue requests for line tests, peruse online traffic analysis reports and check the status of service orders

On-line results

The system also automates the process of requesting loop-back tests by enabling users to issue a line test request on-line to Southwestern Bell Telephone, obviating the need to place calls and fill out forms, as is commonplace today, Haberberger said. Users can then view the test results on-line.

Traffic reports that would typically be printed and mailed to customers can also be viewed on-line. The reports show daily and weekly usage per trunk per hour and are designed in part to help users decide when and where to add or drop trunks.

The system's service order checking capability enables users to view a list of service order requests along with the status of those requests, whether they are still pending or complete, Haberberger explained.

Customer Network Adminis-
(continued on page 22)

Standards bodies losing ground to industry groups

Users warn that development process is too slow.

By Anita Taff
Washington Bureau Chief

ORLANDO, Fla. — Users warned a group of major standards bodies here that they are moving too slowly in developing standards and risk losing control to ad hoc user and industry groups.

"Timely development and deployment [of standards] is essential to users," said Ed Bonkowski, chairman of the International Communications Association's Committee on Technology and Standards. He told standards developers, who were meeting at the American Telecommunications Standards Symposium (ATSS) here, that ad hoc groups

developers they must work harder to get user input, streamline processes and speed development of standards.

Need for speed

Elizabeth Adams, managing director of the Network Management (NM) Forum, one of the industry consortia referenced by Bonkowski, said speed is essential in setting standards. NM Forum has 100 members from 18 countries who are working to develop a common approach to network and systems management.

"There are many who believe that the standards community will never produce what's needed in time to be useful and that by the time a standard is finally published, the technology will have changed," Adams said. "Unless the standards bodies become more sensitive to the needs of their clients and unless they are willing to meet stated deadlines, their role will be usurped by market standards, which may or may not serve the advance of technology."

The value of user input

Many users at ATSS said it seemed as if standards development marches along in a void. Users and standards groups agreed that bringing users into the process early could enable them to avoid costly mistakes.

Consider, for example, the Integrated Services Digital Network. The mere mention of ISDN at any standards group meeting (continued on page 22)

Many users at ATSS said it seemed as if standards development marches along in a void.



working on implementation agreements for such technologies as frame relay are springing up rapidly because the current standards process is not working.

"You see these [ad hoc groups] because you're losing control of the standards process," Bonkowski said.

He and representatives from other user groups told standards

Major user groups have been pressing the FCC to force the Bell operating companies to include performance data in their tariffs, which is not required.

A group of 13 cable operators formed a new coalition, **America's Cable Television Independent Voice**, to express concerns about some impending actions before the Federal Communications Commission and Congress, including an FCC proceeding that would allow telephone companies to carry video signals. Another concern is legislation that would re-regulate the cable industry or allow the carriers to produce programming as well as transmit video signals. □

Carrier airs network management system

continued from page 21

tration replaces a Bell Communications Research-developed CustomMate system, which some regional Bell holding companies currently sell. Southwestern Bell Telephone stopped selling CustomMate in December 1990, saying it was too difficult to use.

Haberberger pointed out that CustomMate did not have a graphical user interface and could not run Windows.

Southwestern Bell Telephone began working on Customer Network Administration early last year. A prototype was available by last summer, and in August, more than 20 customers witnessed its demonstration at Southwestern Bell Technology Resources' Human Factors Analysis and User Interface Design Laboratory here.

A few modifications were requested by users and incorporated into the system. "We think our customers will be very pleased with what they will see," Haberberger said. □

Standards bodies losing ground

continued from page 21

will elicit groans and shaking of heads. It has become the butt of jokes and is seen by many in the industry as one of the worst examples of the standards process gone awry.

If users had been brought into the process, they might have been able to steer ISDN in a way that more closely fit customer business needs and might have pushed developers to deliver the standard earlier.

User input might also have pressured vendors to work together and avoid the many embarrassing and costly interoperability problems that have plagued the service.

ISDN is not the only service that could benefit from user involvement, though, and attendees at the group last week underscored the need for user participation in all standards work.

"I sense uncertainty among players in the standards process [about what users want]," said Bonkowski.

He added that users talk to marketing personnel at vendor companies about their needs but the information does not get passed along to the people who attend standards group meetings.

"Management of communications between those layers [in vendor firms] is just not working," Bonkowski said. "I think a lot of standards are developed in a vacuum."

Stephen Rogers, vice-chairman of the ISDN Users Workshop, agreed. "Users don't feel the process is working to their advantage," he told attendees. "When's the last time you brainstormed with a user on how he is going to use the standard?"

Standards developers at ATSS said that

"I think a lot of standards are developed in a vacuum," Ed Bonkowski said.



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more user involvement would be beneficial, and many added that users are welcome now.

Users said that a number of barriers, including the lack of time, money and understanding of the standards process, keep them out.

Rogers said users are often overwhelmed by the "megablob standards-making process," which comprises scores of official and ad hoc standards and implementors groups worldwide.

A chart shown at the meeting contained almost 60 official standards groups worldwide, with arrows drawn to indicate interactions between the bodies. The chart resembled airline flight paths more than a standards development process.

In addition, users said the belief that standards groups move at glacial speeds discourages them from getting involved.

The standards bodies attending ATSS decided to work on ways to make the standards process more accessible to users. First, they will produce a master directory of standards groups that lists the areas of their work and relevant contacts.

The group also agreed to explore the idea of holding standards body meetings in conjunction with major industry conferences in order to cut down on travel time and costs to users who attend such meetings.

The ATSS group voted to form a joint management team comprising representatives from a number of standards bodies to work on ways to streamline the standards process. □

ENTERPRISE APPLICATIONS

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Worth Noting

"In the 1980s, a trillion dollars was expended on software technology, but white-collar productivity actually declined. There is a lot more [to consider] than just automating your production."

Jim Manzi
President and chief executive officer
Lotus Development Corp.
Cambridge, Mass.

Store & Forward

Unix International, Inc. (UI) has released a catalog of approximately 5,500 applications for Unix System V Release 4, reflecting what it claims is the fastest rise in new applications for any release of Unix yet.

UI said the catalog includes products and services from more than 2,400 companies.

The 1992 Unix System V Release 4 Product Catalog is priced at \$15. It can be obtained by calling UI at (201) 263-8400.

Software AG of North America, Inc. has announced the availability of Unix versions of its core products, including Natural, its fourth-generation application development system; Adabas, its relational database; and Network, its communications software.

Originally designed for host systems, the three products are available now for leading Unix operating systems. Pricing ranges from \$1,700 to \$113,700, based on the number of users and the products involved. For more information, contact Software AG at (703) 860-5050. □

Ingres offers latest version across hardware platforms

Unveils application development tools for PCs.

By Timothy O'Brien
West Coast Bureau Chief

ALAMEDA, Calif. — Making good on its pledge to deliver new versions of its database on all supported platforms within 90 days of first customer shipment, Ingres Corp., an ASK company, has announced general availability of Version 6.4 of the Ingres Intelligent database.

Among the most important new features in the enhanced version are the database event alerters that detect changes in data. When inventory levels change, for example, the alerters would automatically submit reorder requests to suppliers.

Other new features include the ability to establish multiple, multithreaded servers for shared database access and updates, enhanced referential integrity constraints and object management capabilities that support the definition of complex or user-defined objects that can be manipulated by SQL commands.

Unix hardware platforms that support Version 6.4 include Hewlett-Packard Co.'s 9000 series, IBM's RISC System/6000, Sun Microsystems, Inc.'s SPARCsta-

tions, as well as systems from Amdahl Corp., Bull HN Information Systems, Inc., ICL North America, NCR Corp., Pyramid Technology Corp. and Sequent Computer Systems, Inc. In addition, the software can run in Digital Equipment Corp.'s Ultrix and

One new feature is the ability to establish multithreaded servers for shared database access.



The Santa Cruz Operation, Inc.'s SCO Unix operating system environments.

Ingres is also making available personal computer versions of its application development tools, Ingres/Windows 4GL for Microsoft Windows and Ingres/Vision-Pro for DOS.

Ingres/Windows 4GL combines a graphical user interface,

(continued on page 24)

Oracle offers upgrade, pen version of its Oracle Card

By Margie Wylie
Senior Editor

BURLINGAME, Calif. — Mightier than the sword and at least a challenge to the keyboard, the pen is making its mark on Oracle Corp.

The database maker plans this week to announce two new versions of its Oracle Card graphical front end, one of which will work with computers that accept input from an electronic stylus instead of a keyboard. The other, which will ship this week, is an updated version of its existing software for Microsoft Corp. Windows.

Modeled after Claris Corp.'s HyperCard, Oracle Card is a software environment from which nonprogrammers can create graphical applications for navigating Oracle databases that include querying, retrieving and

modifying information through a point-and-click interface.

Oracle Card for Windows 1.1, now available for \$699 for the full-development environment, can work with the IBM DB2 and Oracle databases.

The product will also support Microsoft's Dynamic Data Exchange, a Windows feature that lets applications automatically swap information.

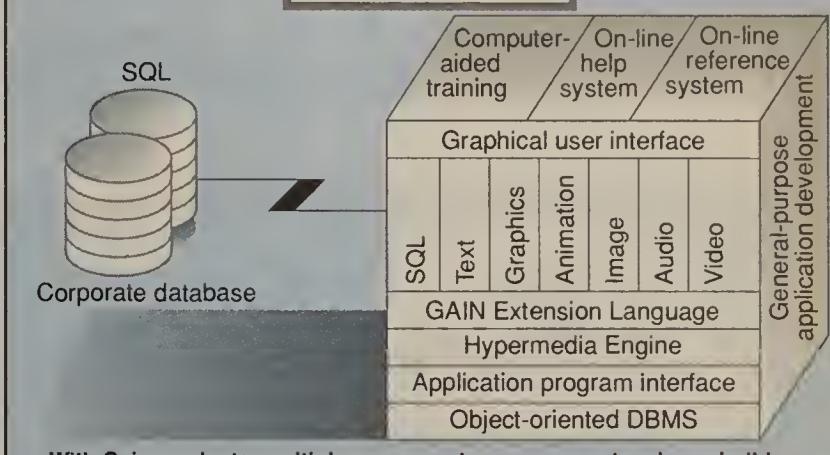
Oracle Card 1.1 will also be available for the first time in less expensive, run-time versions for company sites that do not want to purchase a full-development environment for every computer or allow users to make changes to custom applications created with Oracle Card.

Oracle Card for Macintosh 1.1 will offer comparable features for

(continued on page 24)

Gain's multimedia development environment

Gain architecture



With Gain products, multiple concurrent users on a network can build multimedia applications such as computer-aided training and on-line help and reference systems.

GAIN = Graphical Authoring Initiative

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: GAIN TECHNOLOGY, INC., PALO ALTO, CALIF.

Gain airs multimedia development system

GainMomentum helps development teams build a range of networked, multimedia applications.

By Timothy O'Brien
West Coast Bureau Chief

PALO ALTO, Calif. — Start-up Gain Technology, Inc. is expected to announce on May 11 a software product called GainMomentum that supports the development and deployment of networked multimedia applications.

GainMomentum, running on Unix workstations in a peer-to-peer environment, allows text, graphics, image, sound, animation and video to be integrated into multimedia applications, such as computer-aided training as well as on-line help and reference systems.

IBM and Sun sign on

Although the product has not been formally announced, Gain has already signed a development agreement with IBM and a licensing deal with Sun Microsystems, Inc. for the GainMomentum technology.

"From the beginning, this software was designed to be used in a networked environment," said Thomas Siebel, chief executive officer at Gain.

"With Gain's software, complex objects such as sound, animation and video can be fully utilized in a distributed network environment," he added.

While the company is not yet releasing full details on the product, the software is expected to include a set of tools and system software that will aid in creating

and running multimedia applications across a network of Unix machines.

With the object-based GainMomentum software, multiple users on a network can collaborate to build multimedia applications that can be deployed in single-user or multiuser configurations with full concurrency control and

“From the beginning, this software was designed to be used in a networked environment,” Siebel said.



versioning.

This work group collaboration is important because each developer on a team that is building an application could bring different multimedia expertise to the project.

At the heart of the GainMomentum software is an object-oriented database that supports a “hyperlink” capability that allows developers to reuse blocks of code in order to simplify program development and more easily

(continued on page 24)

Oracle offers pen version, upgrade

continued from page 23

the Macintosh when it ships this summer or early fall.

Oracle Card for Pen Computing, a version of the environment due by year end, will run on Microsoft's recently announced Windows for Pen Computing operating system.

Pricing is not yet available on the software, which will respond to the touch of an electronic stylus rather than a mouse click.

Oracle Card for Pen Computing will also be able to store signatures or other handwritten information in an Oracle database using Microsoft's version of a new data type called "ink."

Ink's drawbacks

Ink data, however, cannot be cataloged, indexed, queried or searched like information input at a keyboard. Oracle suggested that the capability will be most useful for storing information such as approval signatures or an individual's notes attached to a searchable field in the database. □

Ingres offers version across platforms

continued from page 23

an object-oriented fourth-generation language and an application manager in an environment that lets developers create graphical client/server applications.

Ingres/VisionPro is a visually oriented automatic code generating tool for developing character-based applications.

These tools allow organizations to develop and deploy applications on PCs, while allowing those PCs to act as clients to any host system on an enterprise-wide net-

through a series of interfaces to either Ingres or third-party databases.

System pricing for Version 6.4 ranges from \$4,000 to \$460,000, depending on configuration. The Ingres/Windows 4GL Development Kit for Microsoft Windows 3.0 is priced at \$995 per PC. A Deployment Kit providing support for previously developed applications is priced at \$200 per PC. The Ingres/VisionPro application generator is priced at \$495 per PC. □

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Gain airs multimedia development system

continued from page 23

ily access all types of data, including video and images, in large databases across a network.

All data and objects are stored in the object-oriented database, where they can be accessed and used by all the applications. The object sharing saves storage costs and enables changes in objects to be immediately reflected in all applications in which they are referenced.

Company connections

In addition, the company is expected to provide links to SQL database servers from

Sun's new software will combine text, graphics, sound and animation to give users on-line information on how to use Sun hardware and software products.



Informix Software, Inc., Oracle Corp., Sybase, Inc. and Ingres Corp., an ASK company, so that data and images stored in corporate databases can be integrated into GainMomentum applications.

Gain already has agreements with IBM to port this software to the RISC System/6000. It also has an arrangement with Sun, which will use the software to build interactive multimedia training programs for its SPARCstations.

Sun's new software, which has been under development for the past nine months, will combine text, graphics, sound and animation to give users on-line information on how to use Sun hardware and software products. This summer, Sun is expected to introduce its first products using Gain's technology.

Gain plans to port the GainMomentum software to other platforms, including workstations from Digital Equipment Corp., Hewlett-Packard Co. and Silicon Graphics, Inc. Gain is also planning to port its software to Microsoft Corp.'s Windows NT operating system.

The software will be available immediately after its announcement. Pricing starts at \$20,000 and increases based on configuration and the number of users. □

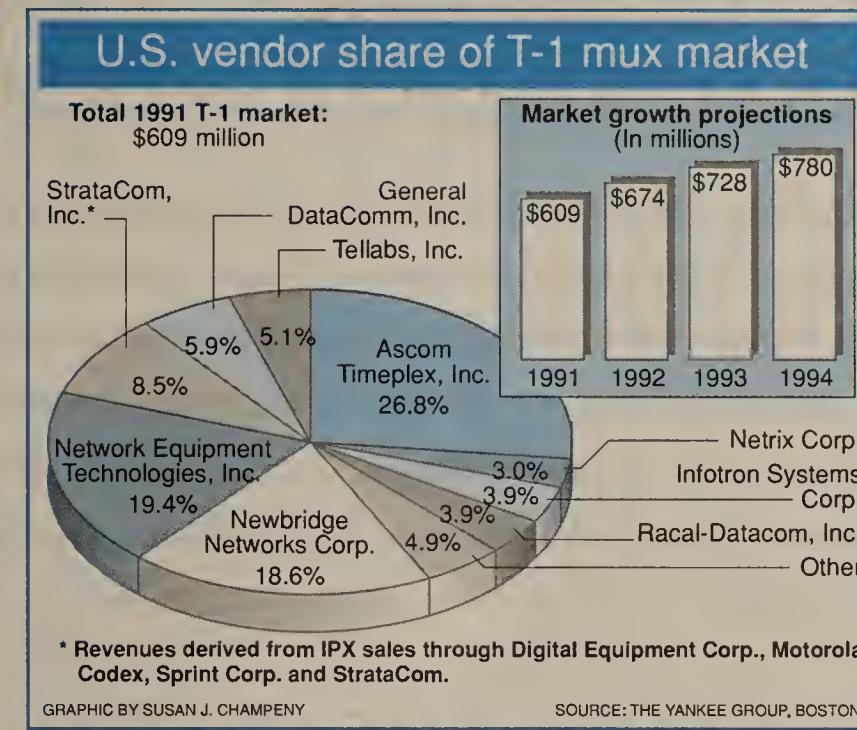
INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

Multiplexer vendors are moving from a targeted T-1 mux strategy, in which one product line could be counted on for 70% to 90% of overall revenues, to a buckshot strategy of broadening product lines targeted at a number of user markets."

Excerpt from "Shifting Sands: The Mux Market Update," a white paper from The Yankee Group, a Boston-based consultancy



Novell helps feds win case against copyright violator

Sentence includes probation, fine and restitution.

By Bob Brown
Senior Editor

BIRMINGHAM, Ala. — Novell, Inc. earlier this month played a key role in one of the first successful criminal prosecutions involving network software copyright infringement.

Novell helped federal authorities in an investigation that led to the indictment and conviction of Zeyad Awwad on eight counts of selling illegal copies of computer and network software. A Novell representative also served as a witness during the trial.

Awwad, who lives here, was convicted of selling illegal copies of Novell's NetWare net operating system and infringing on its copyright.

He was also convicted of illegally copying and selling Dataflex software from Data Access Corp.

A federal grand jury here indicted Awwad based on results from a Federal Bureau of Investigation probe.

Awwad pleaded guilty to eight counts of software copyright violation.

His sentence included restitution to the users victimized, a suspended jail term with one-year probation, forfeiture of \$50,000 in software and hardware, and a \$40,000 fine.

Antipiracy campaign

David Bradford, Novell senior vice-president and general counsel, said Novell has launched a

campaign to eliminate software piracy that includes working with federal, state and local authorities.

"Our antipiracy program protects customers and authorized resellers from infiltration of illicit, oftentimes corrupted products into the marketplace," Bradford said.

Ilene Rosenthal, counsel and director of litigation for the Software Publishers Association (SPA), a Washington, D.C. trade group, applauded Novell's efforts to crack down on pirates. Novell is a member of the association.

"We're hoping we'll see a step up in the criminal prosecutions for copyright infringement," she said.

Lobbying for legislation

It is difficult for vendors and the SPA to get federal authorities involved in software piracy cases today because infringement is currently a misdemeanor, not a felony, Rosenthal said.

The Senate has passed a bill making it a felony, and the SPA is lobbying the House to get it to go along with the legislation.

In addition to helping out with the criminal case against Awwad, Novell has filed six civil lawsuits against firms it believes have made and sold illegal copies of NetWare.

Novell relies largely on an antipiracy hot line to nab pirates. That number is (800) 747-2837. □

BT contracts MIT to develop image tool

Lab will research technology for content-based searches, retrieval of digital images on databases.

By Ellen Messmer
Washington Correspondent

BOSTON — BT, formerly known as British Telecommunications PLC, has enlisted the Massachusetts Institute of Technology to develop an image analysis tool that will make it possible to conduct content-based searches of digital images stored on network databases.

Under a five-year research contract from BT, MIT's Media Laboratory will research technology still in its infancy that will allow users to search for an image stored in a database, such as a film library, based on the image content.

This would be an alternative to searching for the image by visually scanning each video file in the database or finding the image's file name via a text search.

Alan Rudge, BT's managing director for development and procurement, said the goal of the research is to develop automatic tools for searching and editing images and image sequences for database operations.

According to Rudge, the results from the research — some of the most advanced that BT has initiated with a university — will help develop advanced visual telecommunications services for BT's customers worldwide as well as advance knowledge in a number of leading-edge technologies.

Possible practical applications of the research might include video catalogs that allow users to access image databases over telephone lines.

The technology would also make it easier to edit film or image clips.

Digitized images, stored on credit cards, could be used to verify that the card is being used by the authorized person. The card user would stand in front of a camera, which would compare the person's image with the image stored on the card.

Alex Pentland, MIT professor of computer communications and information, said billions of dollars are spent yearly on manual searches through image ar-

(continued on page 31)

NET FINANCIALS

Bytex Corp., a Westborough, Mass., matrix switch and local-area network hub maker, posted revenue for the first quarter ended March 31 of \$10.8 million, down 5% from revenue of \$11.3 million in the similar period last year. First-quarter earnings plunged 86% to \$145,000 from \$1 million during the corresponding period in 1991. Arthur Carr, Bytex's chairman, president and chief executive officer, said sales of the new Series 7700 hubs fell short of what was planned.

Cabletron Systems, Inc., a Rochester, N.H., local-area network hub maker, reported revenue of \$82.3 million for its fiscal fourth quarter ended Feb. 29, up 51% from \$54.4 million in the similar period last year. Earnings rose to \$16.5 million for the quarter, up about 51% from \$10.9 million.

Chipcom Corp., a hub maker in Southborough, Mass., announced record revenue and net income for the first quarter. Revenue was \$16.5 million, a 78% increase compared to \$9.3 million in the first quarter of 1991, and earnings more than tripled to \$1.8 million from \$437,000 last year.

Microcom, Inc., a Norwood, Mass., maker of modems, bridges and network software, last week reported fourth quarter

(continued on page 31)

(continued on page 31)

NOTICE TO NATURALIZED CITIZENS FROM, OR WHO HAVE RESIDED FOR A SIGNIFICANT PERIOD OF TIME IN, THE FOLLOWING COUNTRIES:

Afghanistan, Albania, Angola, East Berlin, Bulgaria, Cambodia (Kampuchea), Cuba, Czechoslovakia, Estonia, Ethiopia, German Democratic Republic (East Germany), Hungarian People's Republic (Hungary), Iran, Iraq, Democratic People's Republic of Korea (North Korea), Laos, Latvia, Libyan Arab Republic, Mongolian People's Republic (Outer Mongolia), Nicaragua, People's Republic of China, Poland, Rumania, Southern Yemen, Syria, Union of Soviet Socialist Republics, Democratic Republic of Vietnam (North Vietnam), South Vietnam, Yugoslavia, the Kurile Islands and South Sakhalin (Karafuto).

YOU MAY HAVE BEEN THE VICTIM OF UNCONSTITUTIONAL DISCRIMINATION BASED ON YOUR NATIONAL ORIGIN

If you are a naturalized United States citizen and your country of origin is included above, or you resided in one of these countries for a significant period of your life, the Department of Defense (DoD) or a DoD contractor may have unlawfully denied you a security clearance or employment, promotion, fellowship or scholarship that required a security clearance, or asked you to apply for a Limited Access Authorization, as a result of DoD's enforcement of a regulation which denied security clearances to newly naturalized United States citizens from these countries or who resided in these countries for a significant period.

The DoD and DoD contractors acted pursuant to a regulation that became effective on January 2, 1987. Although DoD rescinded the regulation on February 12, 1988, it may have been applied after that date. The United States District Court for the District of Columbia has declared the regulation unconstitutional and

permanently enjoined the DoD from enforcing it. Huynh v. Cheney, 87-3436 TFH (D.D.C. March 14, 1991).

If you are a naturalized citizen and you believe you have been adversely affected by the enforcement of the regulation on or after January 2, 1987, you may have certain legal rights. For further information, you should contact the United States Department of Justice Office of Special Counsel for Immigration Related Unfair Employment Practices (OSC), by calling 1-800-255-7688 or (202) 653-8121; 1-800-237-2515 or (202) 296-0168 (TDD device for the hearing impaired); or by writing to OSC, P.O. Box 65490, Washington, D.C. 20035-5490. The OSC will provide information and help you process a claim free of charge. The opportunity to pursue these rights is subject to certain time limits, so if you believe the regulation was applied to you, contact the Office of Special Counsel as soon as possible.

MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

Worth Noting

"Wireless technologies are going to happen, but investing in them is going to be more risky than buying a used car."

Rick Smith
Network manager
Texaco, Inc.
Bakersfield, Calif.

Outsourcing's side effects can inflame instead of cure

Employees may sometimes get lost in shuffle.

By Bob Brown
Senior Editor

BOSTON — While outsourcing is the right medicine for many users, its side effects can sometimes be painful.

Electronic Data Systems Corp. (EDS) recently announced plans to ax 92 former Blue Cross and Blue Shield of Massachusetts employees who were transferred to the Dallas-based firm in an outsourcing deal.

Last month, Digital Equipment Corp. and Eastman Kodak Co. were slapped with lawsuits by 11 former Eastman Kodak employees currently working for DEC. The workers allege unfair treatment by both companies stemming from Eastman Kodak's celebrated outsourcing contract with DEC and are seeking millions of dollars in punitive damages, according to Peter Calviera, their attorney.

These incidents and other emerging evidence show some of the downsides of outsourcing. A management consulting firm has, in fact, raised the question of

whether outsourcing is really in the best interest of corporate America. In a survey of 250 chief information officers, Gateway Information Services of New York concluded many users are signing outsourcing deals to reap short-term benefits at the expense of long-term gains.

"For the last couple of years, the headlines have been about the benefits of outsourcing," said Ray Manganelli, president and chief executive officer of Gateway. "Our prediction is that, this year, the headlines are going to be dominated by the negative aspects of outsourcing — litigation, layoffs and renegotiations."

The layoff of the Blue Cross and Blue Shield employees as fallout from the company's 10-year, \$800 million outsourcing deal with EDS should come as no surprise, according to an EDS spokesman. The possibility of a work force reduction was discussed when the contract was announced in January, and EDS is trying to help these employees

(continued on page 31)

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

Planning for disaster. Contingency Strategies Associates, Inc. (CSA) recently announced a reference kit designed to help net managers devise disaster recovery plans for voice and data networks. The package, titled Developing Network Disaster Recovery Plans, consists of personal computer software that provides a tutorial on the concepts, methodologies and resources needed to develop a network disaster plan. Other software in the kit contains sample files and records that net managers can modify or incorporate directly into their plan.

The kit costs \$995 and can be ordered by calling (203) 674-1855. CSA also offers kits to help managers develop disaster recovery plans for data centers and PC local-area networks.

Electronic payments rising. The National Automated Clearing House Association (NACHA) recently announced statistics showing that U.S. residents are increasingly conducting transactions using electronic payments. According to NACHA, 27 million U.S. workers — about 25% of the work force — now receive paychecks via direct deposit, an increase of 110% since 1989. NACHA also said 43% of these workers participate in an automatic bill payment program for one or more recurring expenses, such as utilities or life insurance premiums.

In 1990, there were more than 1.5 billion payments made electronically in the U.S. that were collectively valued at more than \$1.6 trillion. □

Association Watch

The Open Software Foundation, Inc. (OSF), Arizona State University and the Network Career Advancement Institute are teaming to offer three courses this spring and summer on distributed networking. Courses, which range from \$995 to \$1,195, will be held at the Arizona State campus in Tempe.

"Navigation of Information Infrastructures" is a hands-on course that describes new distributed networking environments using open systems protocols. It will be offered May 5-8. "Open Application Planning," which will run June 15-17, provides a functional look at the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) and a way to plan advanced manufacturing applications.

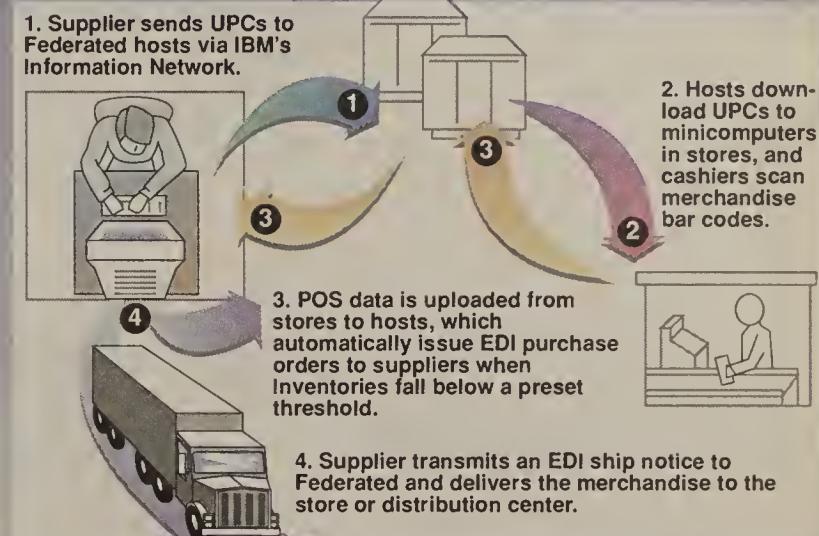
"OSF-DCE Application Programming," which will be held Aug. 10-12, will help application developers learn to design DCE applications.

For more information, call (714) 838-5458.

The Southwestern Bell Telephone ISDN/Advanced Technologies User Forum will hold its second meeting May 19-20 at the Southwestern Bell Building in Houston. For more information, call (314) 247-4613. □

Federated embraces quick response

EDI and other technologies reduce inventory while keeping store shelves stocked.



GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: FEDERATED DEPARTMENT STORES, INC., CINCINNATI

Retailer stays ahead via new technologies

Federated keeps its rivals at arm's length with use of EDI, bar code and inventory management.

By Wayne Eckerson
Senior Editor

CINCINNATI — During the past two years, Federated Department Stores, Inc. has sunk \$60 million into new information technologies, an investment that is helping the industry giant step a little quicker in the fast moving retail market.

Federated, which owns such retail chains as Abraham & Straus, Bloomingdale's, Inc., Jordan Marsh Co. and Burdines, has deployed electronic data interchange, bar code and inventory management technologies in each of its eight retail divisions, which comprise 222 stores throughout the U.S.

The integrated set of technologies, dubbed the Federated Accelerated Sales and Stock Turn (FASST) system, has enabled Federated to achieve closer ties with its major suppliers, boost merchandise sales and reduce inventory, among other things.

"The company has made the rollout of FASST technologies one of its highest priorities," said Lisa Lichtenberg, divisional vice-president of merchandise technology at Federated in Norcross, Ga. "FASST will give us an advantage over some of our competitors and help us catch up with others who have already deployed advanced technology."

With FASST, Federated auto-

matically sends out purchase orders via EDI to suppliers when inventory levels for merchandise fall below preset levels. By automating this process, Federated has reduced the time it takes to replenish stock from weeks and months to just days and helps keep store shelves stocked with fast moving items, she said.

So far, so good

Although the retailer has not quantified FASST's benefits, Lichtenberg cited some promising gains from the project. For example, in the first six months that Hanes Hosiery, Inc. participated in the FASST program, sales of its products jumped 28% in the Burdines department stores. In addition, inventory turns for Arrow Co. shirts increased by 50% in one season at The Bon Marche stores.

Federated has initially selected 110 suppliers to participate in the FASST program. These suppliers, which account for a significant portion of Federated's annual sales, meet the following qualifications: they mark 100% of their merchandise with Universal Product Code (UPC) labels, support the Voluntary Interindustry Communications Standards for EDI and are able to transmit electronic catalogs that correlate UPCs to specific information

(continued on page 31)



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Tuesday, May 19th

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Presentation 9:00 am

Light lunch and product demos 12:00 pm

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Retailer uses new technologies

continued from page 27

about the merchandise, such as style, size and color.

FASST is targeted at basic merchandise that changes infrequently and is reordered regularly, such as hosiery, men's shirts, certain housewares, intimate apparel, shoes, men's casual slacks and home textiles.

Currently, only a fraction of Federated's merchandise is replenished via FASST, but Lichtenberg estimated that 25% of the merchandise eventually will fall under the quick response system.

How it works

Suppliers in the FASST program use EDI to transmit UPCs for their products to Federated's four IBM mainframes in its Norcross data center. The main-

frames currently store more than 10,000 vendor-supplied UPCs. Federated cross-references these bar codes with data found in the vendor-supplied electronic catalogs and adds other data to the code, including department numbers and prices.

The mainframes download updated UPCs daily to minicomputers in the Federated stores. Cashiers at the stores scan the UPCs of merchandise being purchased. Data captured at the point of sale is stored on the minicomputers and uploaded periodically across T-1 lines to the host processors.

That setup enables Federated to maintain accurate and timely records on merchandise sold at each store as well as on inventory levels. When inventories drop be-

low preset thresholds, the company's host-based inventory management system automatically sends an EDI purchase order to the appropriate suppliers.

About 20 Federated suppliers have their own inventory replenishment systems, which track and monitor sales of their merchandise in Federated stores, Lichtenberg said. In those cases, Federated simply transmits POS data via EDI to the supplier. When the supplier determines that inventories need restocking, it automatically transmits an EDI purchase order, followed by a ship notice of the goods it is delivering.

"If the vendor has a good replenishment system, we'll use [it]," Lichtenberg said.

Keeping pace regionally

FASST has also enabled Feder-

ated to speed the delivery of goods from regional distribution centers. When a supplier delivers merchandise, Federated employees at receiving docks use handheld scanners to read UPCs stamped on the outside of delivery boxes. The receivers can then pull up the UPC data on a nearby computer terminal, which tells them on which truck to load the items.

Often, the merchandise moves directly from the supplier's truck to Federated's truck, a process called cross-docking. Previously, merchandise would have been unpacked, inspected and labeled with Federated's own coded tickets, according to Lichtenberg.

By using cross-docking, the company can reduce labor costs and administrative expenses and ship products to its stores faster, Lichtenberg said. □

Outsourcing side effects inflame

continued from page 27

obtain jobs elsewhere in EDS, although the company cannot guarantee them employment, he added.

While the Blue Cross and Blue Shield layoffs were expected by some observers, the lawsuits against Eastman Kodak and DEC have come as a surprise.

The suits stem from Eastman Kodak's 2-year-old agreement with DEC that required the Roch-

ester, N.Y., camera maker to hand over management of its voice and data networks to DEC. The outsourcing deal is among the largest ever and is often cited as a textbook example of how to conduct such a transaction. Eastman Kodak also outsourced portions of its information systems operations to IBM.

The 11 plaintiffs have charged Eastman Kodak in multiple suits with age discrimination and pressuring them to work for DEC, Calviera said. The suits say DEC misled employees about its benefits

plan and charge that Eastman Kodak improved its retirement plan after employees were transferred.

Spokesmen at DEC and Eastman Kodak declined to comment on the suits, citing company policies against discussing pending litigation.

Regardless of whether the allegations are true, the suits point to some potential problems that outsourcing deals can spawn, according to industry observers. "These events will make users more cognizant of the human re-

Net Financials

continued from page 25

revenue for its fiscal year ended March 31 of \$73.9 million, up 33% from \$55.4 million reported in the fourth quarter last year. The company's earnings were \$999,000, a turnaround from a loss of \$19.1 million in the fourth quarter last year.

Microsoft Corp. posted revenues of \$681 million for the third quarter of fiscal 1992, which ended March 31, a 40% increase over the \$487 million for the same period in 1991. Earnings for the quarter were \$179 million, a hike of 44% percent compared to \$124 million in 1991.

Voice processing vendor **Octel Communications Corp.** last week announced third-quarter revenue of \$48 million, up 17% over revenue of \$40.9 million in the third quarter last year. Octel earned \$5.7 million in the quarter, ended March 31, up 21% from \$4.7 million in the previous year.

PictureTel Corp., a Danvers, Mass., videoconferencing

equipment maker, posted first-quarter revenue for the period ended March 28 of \$28.4 million, more than double the \$12.1 million it pulled in for the first quarter last year.

The company earned \$2.8 million in the quarter, more than four times the \$658,000 it earned in the corresponding quarter last year.

VMX, Inc. reported record quarterly revenues of \$17.4 million for its third fiscal quarter ended March 31, up 22% from

\$14.2 million in the third quarter last year. Earnings were \$1.1 million, compared with a loss of \$636,000 in the third quarter last year.

Router maker **Wellfleet Communications, Inc.** of Bedford, Mass., reported revenues for its third fiscal quarter ended March 31 of \$22.5 million, up from \$10 million in the same quarter last year. Earnings were \$3.6 million, about triple the \$1.2 million earned in the third quarter last year. □

People & Positions

continued from page 25

Mani Subramanian, formerly vice-president of engineering at Racal-Milgo's network communications group, has joined **Verilink Corp.** as vice-president of advanced product development.

In the newly created position, Subramanian will be responsible for the ongoing development of the company's next-generation products. He will report to Barry Soloway, vice-president of engineering. □

Chuck Kaekel has been appointed vice-president of quality at **David Systems, Inc.**, a Sunnyvale, Calif., wiring hub maker. He will oversee the formation of a customer service and quality assurance department.

Previously vice-president of engineering at David Systems, Kaekel will report directly to Henry Notthhaft, David Systems' president and chief executive officer.

Jim Checco, formerly vice-president of engineering at **Timeplex, Inc.**, will replace Kaekel as vice-president of engineering. □

BT contracts for image tool

continued from page 25

chives. But if the MIT Media Lab's work on developing BT's Advanced Image Tool for Telecommunications is successful, a user will be able to simply "show" a computer an image and ask it to retrieve all similar images.

Content-based searches will turn up similar images. Although the image search may never be perfect, Pentland estimated it could reduce the time users spend conducting image searches by 90%. MIT and BT are developing the access tools that will make that reduction possible.

Pentland said the science of pattern analysis is still young and fundamental research needs to be done.

"We can do simple things now," he said. "I hope we can do more sophisticated things in five years. From BT's point of view, they will have the technical grounding to introduce products."

A BT spokesman said once the basic technology is developed, the company will likely partner with software firms and others to develop applications for users. □

OPINIONS

NETWORK MANAGEMENT

BY MICHAEL ZURIK

Network managers can join movement to improve quality

Network managers can apply many of the ideas promulgated by the growing number of businesses that have joined the movement to improve the quality of work processes in their departments. They and their technicians simply have to be willing to commit to a systematic approach.

First and foremost, they must do the right thing the first time. Prevention is the key here. Doing the right thing the first time produces results that are more permanent than the easier Band-Aids of crisis management. It involves getting at the root of systemic problems and changing things, often in fundamental ways — an approach that typically is not easy and may take considerable time.

Where I work, we used a common quick-fix approach when we set up our initial personal computer menuing scheme that was designed to give users easy access to applications on the network. Our quick and dirty method was to use a woefully limited shell just to get it up and running.

When the time came to replace the shell, we realized the directory and file configurations were influenced by the inadequate menu shell, requiring us to change those, as well. The result was that we did a lot of extra work, had to put up with considerable network downtime and needed time for additional debugging. This could have been avoided had we taken the time to do what we knew was right the first time.

Managers must also empower employees. This may seem scary at first because many managers believe they must direct, control and dictate decisions and answers to their work force. But it's productive because the amount of creative energy, ideas and improvements employees generate is tremendous.

We recently gave employees the authority to design the cabling and connection scheme for a new part of our building. We also agreed to go with whatever they came up with without a lot of second-guessing from management. The employees felt more committed to the project, and the result was exemplary. The positive outcomes of empowerment often include higher morale, greater effectiveness and increased production.

Further quality improvements can be had by focusing on the customer, who, in the case of a network manager, is the end user. Quality initiatives emphasize that the value of goods and services provided is relative to how well they meet or exceed the needs and requirements of customers, or in this case, end users.

You should find out the user's needs and verify that the most important ones are understood and agreed to by you and your users. A simple way of staying abreast of requirements is to periodically survey the users, either through questionnaires or interviews. Use those interviews to listen and those surveys to gather information and perspective, not to justify your own beliefs or convictions.

We installed desktop publishing software on our network without input from our users because we considered it a valuable application to have.

Unfortunately, the users almost never utilized it, and it took up significant space on the server.

While quality is the latest buzzword on everyone's lips, the path to network quality takes time and effort. The payoffs, however, can be enormous. □

Zurik is an information systems manager for the Jamaica, N.Y.-based Eastern region of the Federal Aviation Administration.

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EDITORIAL

Bungled Tariff 12 rulings complicate lives of users

The regulatory system is designed to protect users, but that's not always the way it works. Case in point: the Federal Communications Commission's confused handling of Tariff 12.

Since December, an FCC ruling has barred customers of AT&T's custom network tariff from making major changes to Tariff 12 packages that include 800 service.

Ironically, that problem stemmed from an earlier FCC decision confirming the legality of Tariff 12. (That decision came after Tariff 12 users, typically the nation's largest companies, waited in limbo for months while the agency weighed the fate of AT&T custom nets.)

OPINIONS

IN-HOUSE DEVELOPMENT

BY MARY JOHNSTON TURNER

The make/buy decision: getting it right

For too long, network managers have been opting to develop their own customized solutions, rather than buy an off-the-shelf product or hire an outsourcing vendor to achieve the same results at less cost.

However, innovation, market growth and mass production have turned many formerly exotic technologies and services into commodities. Voice services, centralized computing and private data networks are just a few areas in which the vendor community is well down the learning curve. Users are best positioned if they buy these items from vendors.

Distributed computing and network management are currently the highest priority areas for many vendors and are likely to cross into the off-the-shelf category in the near future. But it's important to remember — particularly when a turnkey outsourcing solution is under consideration — to make sure the vendor really can deliver the required functionality on time and on budget.

The right time to choose a "make" decision is when you have a well-defined and specialized need that is mission-critical, are convinced that the market will not satisfy your need anytime soon, and have the skill to develop or specify and supervise the development of the solution by outside contractors. Without all these elements, you are probably better off waiting until the market offers something you can buy.

Network managers often allow themselves the luxury of believing their requirements are unique and, therefore, only a custom solution will suffice. In the tough markets of the 1990s, the dual requirements of rolling out new applications quickly and keeping costs down will make this luxury unaffordable.

Winning network managers are likely to develop much less in-house during the 1990s than they did in the 1980s.

Furthermore, industry-standard solutions plus the extra value that each vendor provides should continually reduce the need to do it yourself.

Holding on to a pet in-house project too long will cost you lots of money while hindering your ability to provide competitive services to your end users. In the worst case, it could leave your core business operating inefficiently compared to competitors that have adopted newer, less costly off-the-shelf solutions.

To execute the right make/buy decision, you must constantly stay abreast of technology development and declining technology price curves.

You must also track the activities of industry consortia such as the Network Management Forum and the Frame Relay Forum so you can better judge how the technology is developing.

Also, keep close tabs on what is occurring in the marketplace. The vendor community is responding to user interest in off-the-shelf, turnkey solutions. Where once vendors sold boxes, now they provide one-stop shopping, systems integration and network planning services. Even as margins on hardware decline, vendors are sinking money into the service part of their businesses. The result is that robust solutions are available now more than ever before.

When off-the-shelf solutions and vendor support services don't fit the bill, systems integration and outsourcing will often still be a more effective solution than doing it yourself.

Systems integrators have already solved problems similar to yours and, therefore, have more experience than you do on how

best to use off-the-shelf components and proprietary software. In addition, they will guarantee service levels, costs and delivery schedules — items internal staff often find it difficult to stick to.

So where should the do-it-yourself dollars be directed in the 1990s? Obvious areas are contract management and negotiation; new technology tracking; functional specification of system requirements; and integration of systems and network management. Intercompany communications and multimedia solutions will also need in-house support, beyond what vendors will typically provide in the next few years.

The need for an internal management team and business-specific expertise will also continue to be required of any competitive user organization. The most successful managers will work hard at linking information technology to business applications and building bridges to the business users of those applications.

By buying commodity products and off-loading non-value-added responsibilities as quickly as possible after appropriate products and services become stable, these managers will find time to think about the role of technology in enabling the core business.

Finally, the successful manager will keep a lid on costs and still have dollars left for innovation by choosing make/buy options that reflect the objective realities of the current state of technology, not the existing skill base and pet projects. □

Johnston Turner is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting firm that focuses on strategic management and information technologies.

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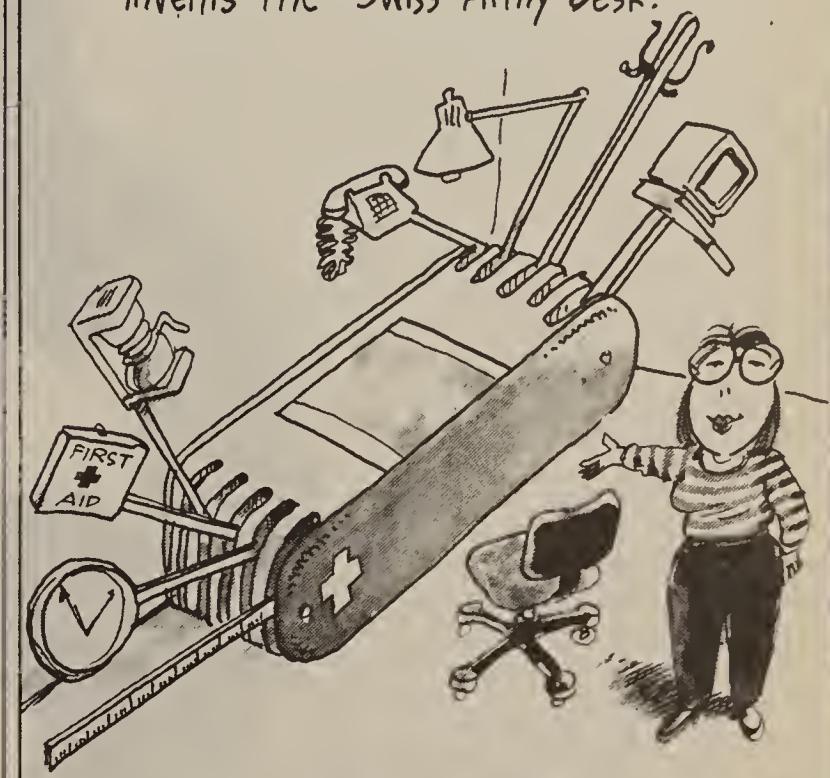
TELETOONS

BY FRANK AND TROISE

Great Moments in Networking

May 24, 1989

LAN Administrator Margaret Gateway invents the Swiss Army Desk.



Phil Frank

LETTERS

Restricting telemarketing

I am writing regarding Michael Finneran's column ("Congress blunders in trying to manage telemarketers," NW, March 23) regarding recently enacted congressional legislation that regulates the telemarketing industry. The article does not offer a workable alternative approach to consumer control of unwanted or intrusive telemarketers.

The legislation places the onus on the telemarketer to monitor a database of people who do not wish to receive the telemarketers' calls. This arrangement is similar to that used by direct mail marketers — an arrangement that has worked quite well.

The article proposed using calling line identification technology to allow call recipients to block all calls from exchanges where telemarketing calls originate. However, this approach is unworkable because it would force the subscriber to identify and then

block out entire exchanges in order to restrict a single annoying caller.

In the worst case, a consumer might be forced to block all exchanges in the New York metropolitan area to restrict a few callers. Clearly, this is not a practical alternative.

Junk mail is both bothersome and wasteful; telemarketing is clearly more environmentally and economically efficient, and its appropriate application should be encouraged for the benefit of our industry and the world at large.

James Innes
Marketing manager
MicroNet, Inc.
Jamison, Pa.

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TELECOM

BUYER'S

GUIDE

INTERACTIVE
VOICE
RESPONSE
SYSTEMS

Dialing for data

CONTINUED FROM PAGE 1

IVR systems on the market today have been enhanced to support some form of facsimile processing, including the ability to fax information to callers who enter their fax numbers via a telephone keypad.

These are the newest capabilities being added to venerable IVR systems, which are specialized computers that attach to a host computer and enable push-button telephones to emulate terminals. Most IVR systems can also handle basic voice mail and automated attendant applications.

In addition to application software, IVR systems consist of a personal computer, minicomputer or mainframe as well as boards that provide connections to dial-up lines, convert voice signals between analog and digital, and establish links to host computers. Today, more than 50 vendors make IVR systems.

The great majority of vendors build their products using standard Intel Corp. 80386- or 80486-based PCs. This approach enables them to use off-the-shelf components, such as voice boards, and storage devices to keep system costs down. PCs have given the 2-decade-old IVR system technology the shot in the arm it needed to become as widely accepted as it is today (see "IVR systems: They've come a long way," page 39).

Only a few vendors, such as American Telesystems Corp., Arkansas Systems, Inc., Centigram Communications Corp. and Computer Consoles, Inc., prefer to build proprietary hardware platforms that offer greater processing power, faster data throughput and greater voice storage capabilities than PC-based systems.

The type of hardware platform vendors use typically limits the number of interface boards

Flush with new features, IVR systems provide more callers with access to a broader range of host data via telephone.

the IVR system can support, and thus, the number of phone lines and host computer links.

While the number of voice ports the system supports is important, the number and type of computer interfaces it supports is a significant aspect of an IVR system. These host interfaces and associated communications protocols determine the type and amount of information the computer and IVR system can exchange.

Many IVR systems support multiple host interfaces and protocols. An asynchronous RS-232 link is the most common nonproprietary interface used today. It is also one of the easiest to use and most cost-effective to operate.

Every personal computer — and the vast majority of IVR systems — come equipped with an RS-232 interface that supports the flexible asynchronous communications protocol. Asynchronous data can be transmitted directly to (*continued on page 38*)

CHART • GUIDE

A Buyer's Guide chart comparing the features of interactive voice response systems begins on page 42.

(continued from page 37)

any other computer with an RS-232 port and easily encapsulated in a variety of other communications protocols, such as X.25, Digital Equipment Corp.'s DECnet, IBM's Systems Network Architecture and Unisys Corp.'s Poll>Select, which provide access to an even wider range of hosts.

Asynchronous communications is not without its drawbacks, however. For instance, the top speed for an asynchronous data link is typically 19.2K bit/sec. Another limitation is that many systems cannot handle more than 16 concurrent asynchronous connections.

Emulating an IBM cluster controller or terminal is the most popular way to link an IVR system to applications running on IBM mainframes or minicomputers. Most IVR systems include software that makes them appear as an IBM 3174 or 3274 cluster controller to an IBM mainframe. These emulators enable telephones to act as IBM 3278 terminals and typically allow as many as 32 simultaneous calls to be processed over a single host link.

Similar in function, IBM 5251 cluster controller emulators are used to access applications on IBM System/36, 38 and Applica-

tion System/400 minicomputers. These emulators make phones appear as IBM 5250 terminals and typically support eight simultaneous calls over a single host link.

IBM 3278 terminal emulation enables an IVR system attached to a 3174 or 3274 controller to access mainframe applications. IBM 5250 terminal emulation enables an IVR system linked to a 5251 controller to access mini-

ring local-area networks. Such network interfaces make the IVR systems appear as nodes on the network — similar to other workstations. Attaching an IVR system to a LAN enables it to access data stored on LAN-based PCs. There is a growing demand for this type of interface as more and more companies retire their mainframes for LAN-based solutions.

There are a number of impor-

tant host interface features to consider when shopping for an IVR system. Most vendors offer all these features with their systems, so you should be cautious of a product that lacks any of them.

Systems with automatic log-on/logoff features automate the process of going through password protection, security layers and other handshaking necessary to access a host database.

Keep-alive support prevents a host computer from disconnecting a caller during periods of inactivity, such as when a caller pauses on the phone while trying to remember an account number.

Most systems also support disaster prevention and recovery features that enable them to detect when a host is going down, reboot themselves following a failure and verify host computer system status.

When the host shuts down, it sends an alarm to all attached terminals. An IVR system connected to a host should be able to receive these alarms and act accordingly, such as calling a technician and playing a prerecorded message.

Connecting with a host is what makes IVR systems shine for data retrieval or entry applications

that would otherwise require an operator to take information from a caller, enter commands into a terminal, wait for results and then read them back. The systems can also increase the accuracy of transactions by enabling callers to enter data without any middleman and by reading data back to the caller for verification.

Application issues

But users must be able to develop those applications. This can be a difficult task for those not familiar with the programming languages these systems use. PC-based systems typically use a common language such as C, while those based on proprietary hardware use vendor-specific languages.

To make life easier, users unfamiliar with programming languages can purchase an application generator package. This high-level program enables value-added resellers, distributors and end users to create an application in days rather than months, without the involvement of the system manufacturer or dealer.

Application generators are highly structured and menu-driven. Some run under Microsoft Corp.'s Windows and provide

A synchronous communications is not without its drawbacks.



computer-based applications. These emulators only support a single call on each host link.

Most vendors also enable their IVR units to emulate Digital Equipment Corp. VT-100 or VT-200 terminals in order to connect with DEC VAXes or other vendors' minicomputers that support those terminal types.

Some IVR systems can also be attached to Ethernet or token-

ring local-area networks. Such network interfaces make the IVR systems appear as nodes on the network — similar to other workstations. Attaching an IVR system to a LAN enables it to access data stored on LAN-based PCs. There is a growing demand for this type of interface as more and more companies retire their mainframes for LAN-based solutions.

Dual-host access

Some IVR applications require access to two or more hosts. For example, if you want to enable



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pull-down menus, mouse support and other aids. They enable users to build applications by choosing menu options or filling in blanks on the screen and then automatically generate software code in the language the IVR system supports.

Some products such as Centigram's DevelopIt, Octel Communications Corp.'s Transact and VoiceTek Corp.'s Generations support customized application development on their installed systems. Third-party products, such as Expert System's EASE, Open+Voice, Inc.'s Open+Build and KISS Software, Inc.'s VoiceTree, run on PCs and enable users to build applications from scratch.

"These new programs are so much better than the esoteric languages and programs we used to have," says Steven Anderson, consulting systems engineer at Bank of America National Trust & Savings Association. "The programs provided with our new Periphonics [Corp.] VPS 7000 system are easy to use for people who understand something about computers and know how to write a flowchart. And you can buy pre-written macros that make the application development process

(continued on page 40)

IVR systems: They've come a long way

It might come as a surprise, but the underlying technology for interactive voice response (IVR) has been around for more than 20 years.

In the early 1970s, some of the first IVR systems were used by bank tellers to verify customer account balances before cashing checks. They were used before the wide availability of reliable dumb terminals that allowed remote users to tap into a host computer database.

Tellers would use a telephone to access customer account databases residing on a bank's mainframe, key in the account number on the phone keypad and receive the account balance via a prerecorded voice.

In the early days

These early IVR systems were mainframe-based and consisted of specially designed hardware and software components. They were also extremely complex and expensive, costing from several hundred thousand dollars to several million.

In most cases, the physical in-

terfaces to a bank's telephone and computer systems had to be designed from scratch, and computer and voice storage components — including circuit boards, memory chips and hard disk drives — cost significantly more than they do today.

The design and programming of a particular IVR application was also an especially time-consuming and expensive endeavor.

Changing with the times

As the microcomputer industry emerged in the 1980s, the resulting increase of computer processing power and steady decrease of its cost began to give voice processing technology — and thus, IVR — a shot in the arm.

IVR systems were no longer dependent on clunky and expensive mainframe hardware components, cryptic as well as inflexible operating systems and programming languages. In addition, IVR system developers began to embrace the new personal computer technology, with its standardized bus, widely

adopted operating system and lower component costs.

As a result, PC-based IVR systems began to drop in price and grow in functionality, making it increasingly attractive to corporate end users.

Enter Tootie

The adoption of PC technology led to the Home Shopping

provided automated transaction processing services to HSN's callers by allowing them to order products shown on the HSN television channel by entering commands from the keypad of their push-button phones, eliminating the need to speak to a sales agent.

Today, Tootie is handling more than 50 million orders a year and serving 50% of all callers who are ordering products. When a person calls the Tootie order number, a toll-free number that connects directly to the system, Tootie answers the call and provides ordering instructions.

Using voice prompts, Tootie speaks to callers, instructing them on which numbers to press on their push-button phones to order and pay for products. Tootie can also prompt the caller for a credit card number and then perform on-line credit verification by accessing remote host computer databases stored on mainframes operated by credit bureaus.

— Marc Robins

Some of the first IVR systems were used by bank tellers.



Network, Inc.'s (HSN) creation in 1987 of Tootie, one of the first IVR systems to make a splash in the media and help widely popularize the technology.

Tootie, built using powerful microcomputer components,

hub that grows hub that doesn't.

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Without paying the price.



(continued from page 39)
even easier."

Bank of America used Periphonics' Peritalk/PC application generator to build high levels of security into applications that enable customers to inquire about their credit cards. "We've come up with some very sophisticated programs to deal with this — programs that also require access to more basic programming languages, like Cobol, on Periphonics' system," Anderson says.

Northrop Corp.'s Aircraft Division in Hawthorne, Calif., used an application generator, InterForm, to build an application that runs on an InterVoice, Inc. Robot-Operator. The IVR application enables engineers and other Northrop staff to use push-button phones to record how much time they've spent on projects. Previously, Northrop staff had to prepare written time sheets, which were then entered into a computer. The application eliminated the necessity of handling 15,000 time sheets and keypunching more than 77,000 records per week, an error-prone process.

According to Ken Johnson, an application development specialist at Northrop, the Robot-Operator system was selected for a number of factors, including the ease of programmability using InterForm and the host computer interfaces it supports.

"The use of [IVR] was immediately beneficial," Johnson says. "About half our people have to record [time sheets] every day for all the jobs they work on." This enables Northrop to apply labor costs directly to its government and other client contracts.

"The validation of labor is absolutely critical so that we don't step on regulations that will put us in hot water," he adds.

Before Northrop installed the system, errors on time sheets or in data entry were detected in verification procedures and required corrective action. "With 13,000 people, these errors added up quite quickly," Johnson says.

After the installation, all the corrective activity has been eliminated because the IVR system helps callers verify the information they enter.

Until now, such benefits could only be realized if every caller had a push-button phone. This limitation has prohibited callers with a rotary or pulse-dial telephone from using IVR applications. Robins Press, a New York research and consulting firm, estimates more than 35% of American households still use rotary-dial phones.

Traditionally, IVR applications instruct callers dialing in from a rotary phone to wait while their call is transferred to an operator. Now, some vendors are

improving their systems with speech-recognition features or pulse-to-tone converters that enable callers with a rotary phone to use IVR applications.

Once confined to laboratories with specially controlled environments, speech recognition in the 1990s has emerged as a commercially viable technology. Speech recognition enables callers to speak commands in response to prompts from an IVR system. While it can clearly eliminate the barrier callers face with rotary phones, even callers with push-button phones can opt to speak commands.

Speech recognition also makes it easy to enter names and words, solving the push-button alphabet dilemma. Spelling names or words using a telephone keypad is a lesson in frustration especially since the letters Q and Z are absent.

Speech-recognition capabilities are available as an option on systems from a number of vendors, including Simpact Associates, Inc., Votan, Voicetek and

Vendors are improving systems with speech recognition.



Wygant Scientific, Inc.

Pulse-to-tone conversion devices detect the pulses, or clicks, from rotary phones and convert them to dual-tone multifrequency tones. A number of IVR system vendors offer pulse-to-tone conversion boards as an option to their systems, including Intertel Systems, Multiverse Communications, Phonetix Corp. and Syntellect, Inc.

Reliable pulse-to-tone conversion is not without challenges, though. A problem with using them in the U.S. oddly enough lies not with the equipment itself but with telephone company central office switches. In some older central offices, if a rotary caller tries to dial any number higher than three after a call has been established, the central office will disconnect the call. Most of the newer central offices are more tolerant of rotary dialing and will not cut the call off if a number higher than three is dialed.

With this in mind, it's important to analyze the tolerances of the central offices through which calls into an application will pass before implementing pulse-to-tone conversion. If service is be-

ing provided in an area that has newer switches, it may be possible to exceed the three-pulse limit. If rotary callers will be using an application from a larger geographic area that has both old and new switches, you can ensure effectiveness by limiting the application menus to three choices at most.

Just the fax, please

Just as speech recognition and pulse-to-tone converters enable IVR systems to support a whole new range of users, a function called facsimile processing enables them to support a new range of applications.

To support fax processing, the IVR system is linked to a fax server, which digitally stores fax doc-

uments for retrieval or transmission. Alternatively, a fax modem or board can be installed in the IVR system.

The three most popular types of fax processing applications that IVR systems support today are fax store and forward, often called fax mail; fax broadcasting; and fax response, often called fax-on-demand.

Fax mail enables IVR systems to receive incoming facsimiles, store them in a mailbox and notify the intended receiver who can then instruct the system to print them. Fax mail can also provide another depository for messages in case a main facsimile machine is unable to receive them.

Fax broadcasting helps reduce the long waits and lines at a fax

machine by automating transmission of a single document to several locations. Users would program a distribution list containing the names and fax numbers of all intended receivers into the IVR system.

While fax mail and fax broadcast can be useful, it is fax response that holds the most promise for IVR systems. Fax response enables the system to fax to the caller a copy of data pulled from a computer database or a copy of a stored image, such as a price list, schematic or map.

IVR is a natural front end to fax response because it enables callers to select a variety of documents in response to voice prompts, choose when the fax

(continued on page 52)

Services let users try before they buy

As an alternative to purchasing interactive voice response (IVR) system equipment, users can obtain service from a growing number of providers. These service providers have high-capacity voice processing systems that support IVR applications, experienced application programmers and system administrators.

Typically, these services carry a low monthly fee as well as low feature and network usage charges and are offered by small, independent businesses. However, a number of carriers, such as AT&T with its Infoworx offering, are now jumping on the service bureau bandwagon and providing a similar range of services.

Before you decide whether to sign with a service bureau for your IVR system needs or buy a turnkey system, it's important to compare the benefits and drawbacks of each alternative. Therefore, consider some of the following points before making your final decision.

First, if your company uses a service bureau, you don't need to establish any special financing to clinch the service. You also won't need to tap into any lines of credit or cash reserves, as you may have to do if purchasing equipment. In addition, because the services can be leased on a monthly basis, the service bureau doesn't require any long-term commitment. This means you won't be stuck with the service longer than you want. If you discover that your application or program turns out to be a dud, you can walk away with a minimal loss.

Most service bureaus are equipped with enormous call handling capabilities. Interactive 800- or 900-number appli-

cations that are media-driven, such as a sweepstakes contest or other promotion that is advertised on television, can generate thousands of calls in a very short period of time. Many service bureaus have high-capacity systems designed to handle these peak loads, which could easily overwhelm most in-house systems.

Service bureaus also constantly upgrade their technology, typically at no additional cost to their clients. Leading-edge technology is a good service bureau's tools-of-the-trade, and most bureaus are quick to embrace any new promising software or hardware component, ensuring you access to the latest application the technology can offer.

With a service bureau, client companies can take advantage of low carrier rates. Since service bureaus buy telephone service in bulk, they can get extremely favorable rates from long-distance carriers and pass some of that savings along to you. Carriers that offer IVR services often bundle rate discounts for large-volume customers. These discounts generally mean lower rates to a client when compared to the rates carriers offer to a new customer.

Another advantage of service bureaus is that they provide on-site expertise. An in-house voice processing system can require a full-time staff person trained to maintain the system and program new applications. Service bureaus already have highly trained technicians and programmers on staff who are familiar with a variety of applications. By leaving all the nitty-gritty technical details to the experts, an end user can focus on the marketing of the pro-

gram.

Many service bureaus have developed extensive software application libraries. The cost of using these available applications is typically much less than the cost of programming one from scratch.

Service bureaus are great resources for testing the effectiveness of certain programs or applications before investing in a turnkey system.

For applications that only run three or four times a year, a service bureau is the most cost-effective resource. For applications that run daily or on a more regular basis, it may be more cost-effective to look into acquiring a turnkey system.

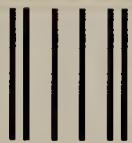
Finally, using a service bureau eliminates the need to store backup system components because all equipment, including backup hardware and software, resides in the service bureau location.

One factor that may sway users to buy their own system is labor cost savings. Users looking to cost-justify an IVR system can expect reductions in labor and other operating costs to approach 20% when the system handles only 10% to 25% of all incoming calls, according to research conducted by Robins

Press of New York. Some users report that IVR systems have an 8-to-1 cost advantage over operators performing routine data entry and inquiry, in part because of the elimination of staff positions and in part because of the increase in the number of customers or in-house staff served by the technology.

When savings approach these levels, some users would be better off buying an IVR system instead of using a service.

— Marc Robins



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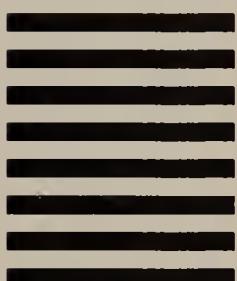
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Interactive voice response systems

Company	Product	Platform	Number of ports	Host interfaces/Number of multiple hosts	Host interface features	Fax processing capabilities	Automated attendant and voice mail	Rotary phone support	Telephony interfaces	Application generator provided	Price/Warranty
Amtelco McFarland, Wis. (608) 838-4194	Tele-Response	Any Intel Corp. 80386- or 80486-based PC	4 to 24	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/16	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	No	Loop start, E&M, DID, ground start, extension line	No	From \$12,000 to \$68,000/1 year
American Telesystems Corp. Atlanta (404) 266-2500	Express Messenger III	Proprietary minicomputer	2 to 24	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Fax notification only	Both standard	No	Loop start, DID, extension line	Yes, proprietary	From \$13,390 to \$128,190/1 year
Apex Voice Communications, Inc. Sherman Oaks, Calif. (818) 379-8400	OmniVox	Any 80386- or 80486-based PC	4 to 48	Asynchronous RS-232; IBM 3174, 3274, 5251 emulation; LAN interfaces; VT-100 and VT-200 emulation/48	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Broadcast, response	Automated attendant NA; voice mail standard	Yes	T-1, loop start, E&M, DID, ground start, ISDN, tie line	Yes, proprietary	From \$17,500 /1 year
Arkansas Systems, Inc. Little Rock, Ark. (501) 227-8471	Tele-Banking System	Proprietary minicomputer	1 to 9	IBM 5251, 5250 emulation/1	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Automated attendant optional; voice mail standard	No	Loop start	Yes, proprietary	\$14,500/1 year
AT&T Business Communications Systems Bridgewater, N.J. (800) 247-1212	Conversant	Any 80386- or 80486-based PC	6 to 48	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; LAN interfaces/9	Automatic logon and logoff, host computer down alarms	None	Automated attendant standard; voice mail optional	Yes	T-1, loop start, ISDN	Yes, proprietary	From \$20,000 to \$95,000/1 year
AudioFAX, Inc. Marietta, Ga. (404) 933-7600	Series 100 and 300	Any 80386- or 80486-based PC	4 to 24	Asynchronous RS-232; LAN interfaces; VT-100 and VT-200 emulation/None	None	Mail, broadcast, response	No	No	T-1, loop start, DID, ground start, extension line	Yes, proprietary	\$7,995/1 year
Ava Technology, Inc. Chelmsford, Mass. (508) 663-0900	AVA-200L/AVA-200U	Any 80386- or 80486-based PC	2 to 12	Asynchronous RS-232/1	None	None	Both standard	No	Loop start, E&M, DID, ground start, tie line, extension line	Yes, proprietary	From \$24,196 to \$45,790/1 year
Azonic Systems, Inc. San Jose, Calif. (408) 729-4900	Topaz	Any 80386- or 80486-based PC	12 to 5,000 (150 nodes)*	Asynchronous RS-232; IBM 3174, 3274 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	Yes	T-1, loop start, E&M, DID, ground start	Yes, proprietary	From \$2,500 to \$6,000 per port/1 year
Brite Voice Systems, Inc. Wichita, Kan. (316) 652-6500	Gateway 5000	Any 80386- or 80486-based PC	24 to 5,000*	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	Speech recognition	T-1, loop start, DID, ground start, tie line, extension line	Yes, proprietary	From \$50,000/1 year
Cecorp Irvine, Calif. (714) 583-0792	Cevoice	Any 80386- or 80486-based PC	2 to 16	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; VT-100 and VT-200 emulation/8	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Automated attendant standard; voice mail NA	No	Loop start, DID, ground start	No	From \$22,050 to \$89,775/1 year
Centigram Communications Corp. San Jose, Calif. (408) 944-0250	Voice Gateway	Proprietary	Up to 960*	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/Up to 255	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	No	T-1, loop start, E&M, DID, ground start, tie line, extension line	Yes, proprietary (Centigram's Developl)	From \$20,000 to \$300,000/1 year
Cognitronics Corp. Stamford, Conn. (203) 327-5307	McIAS 2200/3000	Any 80386- or 80486-based PC	4 to 64	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/1	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Yes	T-1, loop start, E&M, CEPT	Yes, third-party	From \$32,545 to \$80,000/1 year
Computer Communications Specialists, Inc. Norcross, Ga. (404) 441-3114	Firstline	Any 80386- or 80486-based PC	4 to 32	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/48	Automatic logon and logoff, automatic recovery	Response	Both optional	No	T-1, loop start, ground start	Yes, proprietary	From \$32,000 to \$75,000/1 year
Computer Consoles, Inc. Rochester, N.Y. (716) 654-2397	Automated Alternate Billing Systems	Proprietary VME-based minicomputer	24 to 10,000*	Asynchronous RS-232; LAN interfaces; VT-100 and VT-200 emulation/1	Keep-alive support, host computer down alarms, automatic recovery	None	Automated attendant standard; voice mail NA	No	T-1, CEPT	Yes, proprietary	From \$500,000 to several million dollars/1 year
Computer Talk Technology, Inc. Richmond Hill, Ontario (416) 882-5000	Talking Computer	Any 80386- or 80486-based PC	2 to 24	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	No	T-1, loop start, DID, ground start, ISDN, tie line, extension line	No	From \$15,990 to \$1.5 million/1 year
Digital Sound Corp. Carpinteria, Calif. (805) 566-2000	VoiceServer	Multibus 80486-based PC	2 to 192	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response (all optional)	Both optional	No	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line, CEPT	Yes, proprietary	From \$9,871 to \$848,440/1 year
Dytel Corp. Schaumburg, Ill. (708) 519-9850	Call Center Manager	Proprietary	Up to 32	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/14	Automatic logon and logoff, automatic recovery	Mail, broadcast, response	Both standard	No	T-1, loop start, DID, ground start	Yes, proprietary	\$32,000/1 year
Enhanced Systems, Inc. Norcross, Ga. (404) 662-1503	Hello!	Any 80386- or 80486-based PC	4 to 144	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Yes	T-1, loop start, E&M, DID, ISDN, tie line, extension line	Yes, proprietary	From \$6,500 to \$30,000/1 year

Interactive voice response systems (continued on page 44)

Company	Product	Platform	Number of ports	Host interfaces/Number of multiple hosts	Host interface features	Fax processing capabilities	Automated attendant and voice mail	Rotary phone support	Telephony interfaces	Application generator provided	Price/Warranty
FAR Systems, Inc. Fort Atkinson, Wis. (414) 563-2221	The FAR Voice	Any 80386- or 80486-based PC	4 to 24	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/24	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	Yes	T-1, loop start, E&M, DID, ground start, tie line, extension line, CEPT	Yes, proprietary	From \$7,500 to \$40,000/1 year
Granada Systems Design, Inc. New York (212) 686-6945	TelDEAR	Any 80386- or 80486-based PC	4 to 32	Asynchronous RS-232; IBM 3174, 3274, 5251, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response (all optional)	Both standard	Yes	T-1, loop start, DID, ground start, ISDN, extension line, CEPT	Yes, proprietary	From \$20,000 to \$59,500/1 year
IBM Armonk, N.Y. (914) 288-3718	DirectTalk/2	Any 80386- or 80486-based PC	4 to 16	IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces/16	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Automated attendant standard; voice mail optional	No	DID, tie line, extension line	Yes, proprietary	From \$20,966 to \$49,100/1 year
Innovative Technology, Inc. Roswell, Ga. (404) 998-9970	Voice Perfect Receptionist Plus	PC	2 to 24	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/1	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both standard	No	T-1, loop start, DID, extension line	Yes, third-party	From \$4,000 to \$55,000/90 days
Interact, Inc. Lincoln, Neb. (402) 464-8786	VIP	Any 80386- or 80486-based PC	4 to 192	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/24	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	No	T-1, loop start, E&M, DID, ground start, tie line, extension line	Yes, proprietary	From \$3,000 to \$280,000/1 year
Intertel Systems Berkeley, Calif. (510) 649-0404	Interact	Any 80386- or 80486-based PC	4 to 16	Asynchronous RS-232; LAN interfaces/1	Automatic logon and logoff, automatic recovery	None	Both standard	Yes	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line	Yes, proprietary	From \$7,319 to a million dollars/1 to 5 years
InterVoice, Inc. Dallas (214) 669-3988	RobotOperator	Any 80386- or 80486-based PC	6 to 10,000*	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/128	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Automated attendant standard; voice mail NA	No	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line, CEPT	Yes, proprietary	From \$25,000 to several million dollars/1 year
Microlog Corp. Germantown, Md. (301) 428-3227	VCS 3500-IVRS	Any 80386- or 80486-based PC	4 to 48	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/36	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	No	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line	Yes, proprietary	From \$28,000 to \$150,000/1 year
Microvoice Corp. Irvine, Calif. (714) 588-2739	System III	Any 80386- or 80486-based PC	4 to 128	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/64	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Automated attendant standard; voice mail optional	No	T-1, loop start, DID, ground start, ISDN, tie line, extension line	Yes, proprietary	From \$11,250 to \$125,000/1 year
Multiverse Communications New York (212) 580-0541	MultiLang 15	Any 80386- or 80486-based PC	2 to 16	Asynchronous RS-232; IBM 3174, 3274 emulation/1	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	Yes	Loop start, E&M, DID, ground start, extension line	Yes, proprietary	From \$1,000 for software only/1 year
Octel Communications Corp. Milpitas, Calif. (408) 942-6500	PowerCall	Proprietary	4 to 144	IBM 3174, 3274, 3278 emulation/64	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both standard	No	T-1, loop start, E&M, DID, ground start, tie line, extension line	Yes, third party	From \$19,000 to several million dollars/1 year
Perception Technology Corp. Canton, Mass. (617) 821-0320	Vocom V	Digital Equipment Corp. VAX	16 to 96	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/12	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	No	T-1, loop start, E&M, DID, ground start	Yes, proprietary	From \$94,900 to \$184,900/90 days
	Vocom 40	DEC VAX	24 to 96	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/12	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Both optional	No	T-1, loop start, E&M, DID, ground start	Yes, proprietary	From \$80,000 to \$180,000/90 days
Periphonics Corp. Bohemian, N.Y. (516) 467-0500	VPS 7000/9000	Proprietary minicomputer	8 to 64	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Response	Automated attendant optional; voice mail NA	No	T-1, loop start, DID, ground start, ISDN	Yes, proprietary	From \$35,000 to \$150,000
Phonetix Corp. Toronto (416) 922-5742	Voice Courier	Any 80386- or 80486-based PC	2 to 32	Asynchronous RS-232; LAN interfaces/1	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both standard	Yes	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line, CEPT	Yes, proprietary (Orator)	From \$11,900 to \$69,000/3 months
Simpact Associates, Inc. San Marcos, Calif. (619) 565-1865	Client Call	Sun Microsystems, Inc. SPARCstation	2 to 74	Asynchronous RS-232; IBM 3174, 3274 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both optional	Speech recognition	Loop start, E&M, DID, ground start	Yes, third-party	From \$22,500 to \$205,000/1 year
Sonic Systems Santa Monica, Calif. (310) 458-9999	Sonia Receptionist	Any 80386- or 80486-based PC	2 to 36	Asynchronous RS-232/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both standard	No	T-1, loop start, DID, ground start	Yes, third party	From \$6,000/6 months

Interactive voice response systems (continued from page 43)

Company	Product	Platform	Number of ports	Host interfaces/Number of multiple hosts	Host interface features	Fax processing capabilities	Automated attendant and voice mail	Rotary phone support	Telephony Interfaces	Application generator provided	Price/Warranty
SpectraFAX Corp. Naples, Fla. (813) 643-5060	Special Request	Any 80386- or 80486-based PC	8 to 4,000*	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, automatic recovery	Mail, broadcast, response	Both NA	No	T-1, loop start, DID	Yes, proprietary	From \$45,000 to several million dollars/2 years
Syntellect, Inc. Phoenix (602) 789-2800	InfoBot	Proprietary	4 to 600	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Automated attendant standard; voice mail NA	Yes	T-1, loop start, E&M, DID, ground start	Yes, proprietary	From \$20,000 to \$1.14 million dollars/1 year
Talx Corp. St. Louis (314) 434-0046	Talx	Any 80386- or 80486-based PC	2 to 200	Asynchronous RS-232; IBM 3174, 3274, 5251 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Broadcast, response	Automated attendant standard; voice mail optional	No	Loop start, ground start, tie line, extension line	Yes, proprietary	From \$30,000 to \$100,000/1 year
Teknekron Infoswitch Corp. Fort Worth, Texas (817) 267-3025	Infovoice	Any 80386- or 80486-based PC	4 to 48	Asynchronous RS-232, IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	Yes	T-1, loop start	Yes, proprietary	From \$21,000 to \$200,000/1 year
Telecorp Systems, Inc. Norcross, Ga. (404) 587-0700	System 6000 ARU	Any 80386- or 80486-based PC	4 to 60	Asynchronous RS-232; LAN interfaces/8	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both optional	Optional	T-1, loop start, DID, ground start, tie line, extension line	Yes, proprietary	From \$25,000 to \$95,000/1 year
Treva Communications, Inc. San Jose, Calif. (408) 452-1112	EOS Multiple Application Platform	Any 80386- or 80486-based PC or Tandem Integrity S2	4 to 32 (up to 4,800 with 200 nodes)*	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; LAN interfaces; VT-100 and VT-200 emulation/4 per PC	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Yes	T-1, loop start, DID, ground start, ISDN, tie line, extension line, CEPT	Yes, proprietary	\$26,000/1 year
Tribase Systems, Inc. Springfield, N.J. (201) 376-9000	Voice Power 2000	Any 80386- or 80486-based PC	4 to unlimited	Asynchronous RS-232; IBM 3174, 3274, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/Unlimited	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	Optional	T-1, loop start, E&M, DID, ground start, ISDN, CEPT, tie line	Yes, third party	Starts at \$80,000/3 years
U.S. Audiotex Hermosa Beach, Calif. (510) 838-7996	USA.VRU-4	Any 80386- or 80486-based PC	4 to 288	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast	Both optional	Optional	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line, CEPT	Yes, third-party	From \$13,900 to \$259,000/1 to 5 years
Unisys Corp. Blue Bell, Penn. (215) 986-2312	A-Series NAP	Unisys mainframe	24 to 11,700*	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/10,000	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	No	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line	Yes, proprietary	From \$250,000 to \$20 million/Warranty varies by contract
URIX Corp. Horsham, Pa. (215) 443-0600	SARU	Proprietary VME-based	96 to 30,720*	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/8 per 96-port module	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	No	T-1, loop start, E&M, ground start, ISDN, CEPT	Yes, proprietary	From \$70,000 to \$960,000/1 year
VMX, Inc. San Jose, Calif. (408) 441-1144	VMX200/300 with VMX-works	Proprietary	4 to 96	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both standard	No	Loop start, E&M, DID, ground start, tie line, extension line	Yes, proprietary	From \$29,000/1 year
Vocetek Corp. Chelmsford, Mass. (508) 250-9393	VTK-1000	Any 80386- or 80486-based PC, any mini-computer or mainframe	12 to 24	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Speech recognition	T-1, loop start, DID	Yes, proprietary (Generations)	From \$24,000 to \$45,800/1 year
	VTK-2000	Any 80386- or 80486-based PC, any mini-computer or mainframe	12 to 48	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Speech recognition	T-1, loop start, DID	Yes, proprietary (Generations)	From \$28,800 to \$72,000/1 year
	VTK-300	Any 80386- or 80486-based PC, any mini-computer or mainframe	4 to 64	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation/2	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both optional	Speech recognition	T-1, loop start, E&M, DID, ground start, tie line, extension line, CEPT	Yes, proprietary (Generations)	From \$42,000 to \$170,000/1 year
Votan Pleasanton, Calif. (510) 426-5600	VoiceBuilder	Any 80386- or 80486-based PC	1 to 8	Asynchronous RS-232/4	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	None	Both optional	Speech recognition	Loop start	Yes, proprietary	From \$22,600 to \$42,100/1 year
Wang Information Services Corp. Lowell, Mass. (800) 225-0654	Voice Server	Wang VS mini-computer	4 to 96	Asynchronous RS-232; IBM 3174, 3274, 3278 emulation; LAN interfaces; VT-100 and VT-200 emulation/32	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Mail, broadcast, response	Both standard	No	Loop start, E&M, ground start	Yes, proprietary	From \$25,000 to \$800,000/1 year
Wygant Scientific, Inc. Portland, Ore. (503) 227-6901	Micro-ITC	Any 80386- or 80486-based PC	4 to 96	Asynchronous RS-232; IBM 3174, 3274, 5251, 3278, 5250 emulation; LAN interfaces; VT-100 and VT-200 emulation/8	Automatic logon and logoff, keep-alive support, host computer down alarms, automatic recovery	Broadcast, response	Automated attendant standard; voice mail optional	Speech recognition	T-1, loop start, E&M, DID, ground start, ISDN, tie line, extension line	Yes, proprietary	From \$15,000 to \$100,000/1 year

DID = Direct-inward dial

* Maximum capacity when systems are networked together.

CEPT = Conference Europeenne des Postes et Telecommunications

NA = Not available

This chart includes a representative selection of interactive voice response systems. These vendors may offer other products, and other vendors not included may offer a full range of products.

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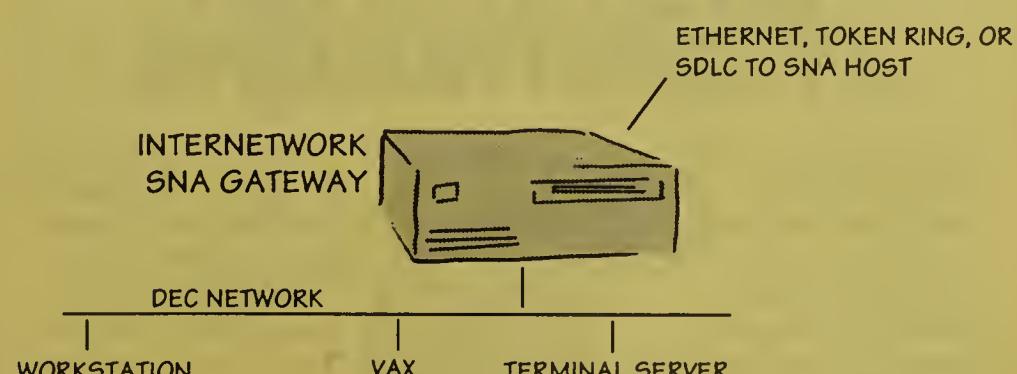
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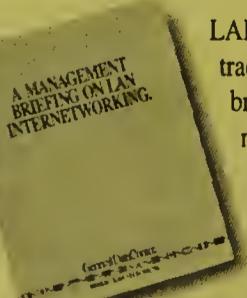
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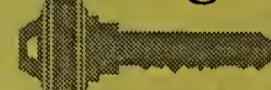
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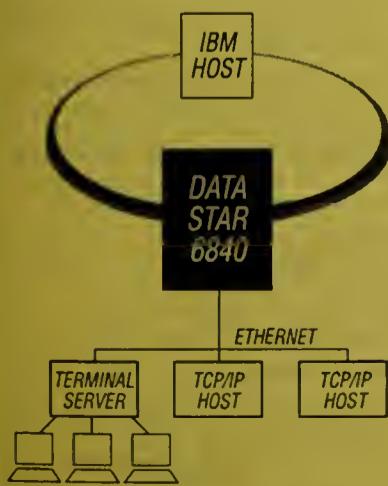
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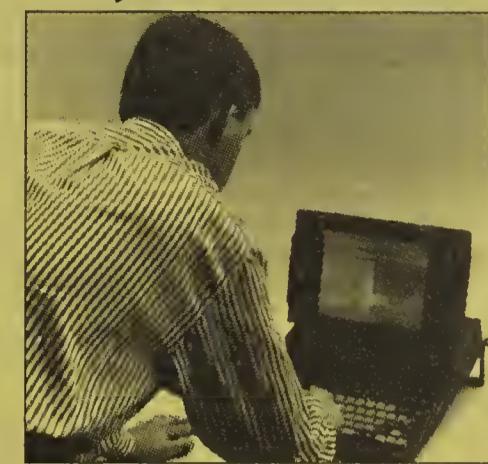
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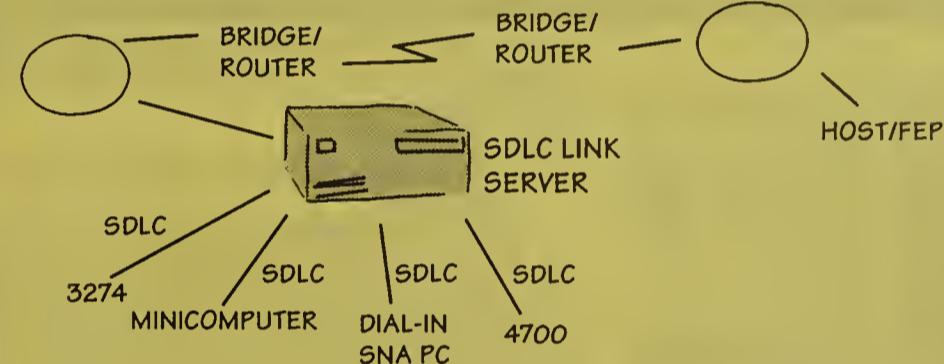
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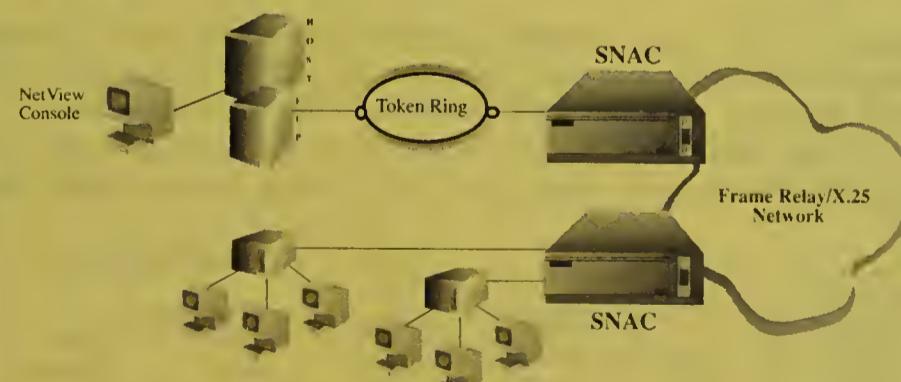
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- Dial-up access to digital networks



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For more information on Switched 56 and on the Dowty DCP3058 TIU and DCP3060 DU, call 800-227-3134 or write Dowty Communications, Cherry Hill Industrial Center, Cherry Hill, New Jersey, 08003.

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Circle Reader Service No. 10



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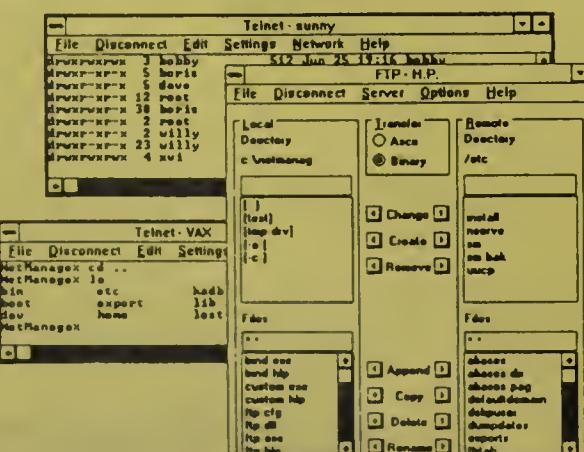
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TCP/IP for Windows 3.0

Chameleon is the first TCP/IP communications package developed specifically for Windows 3.0 (not converted from DOS), allowing multiple concurrent sessions with different accounts and hosts. **Chameleon** is the first TCP/IP applications package in the market implemented as a Windows Dynamic Link Library (DLL) and not a TSR, saving precious 640K base memory.



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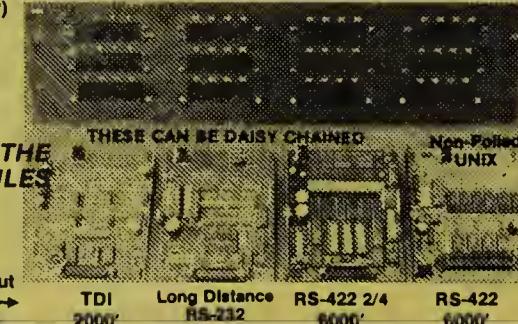
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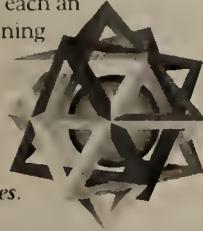
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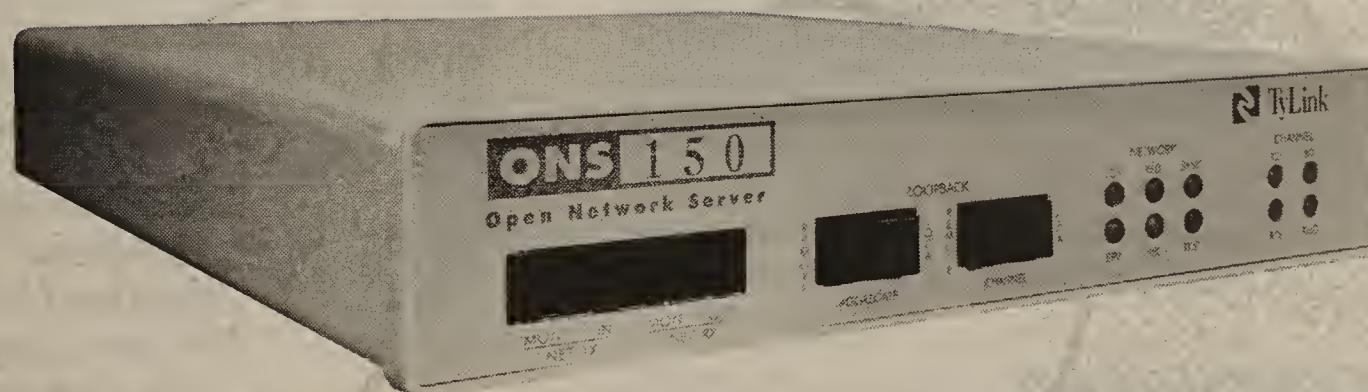
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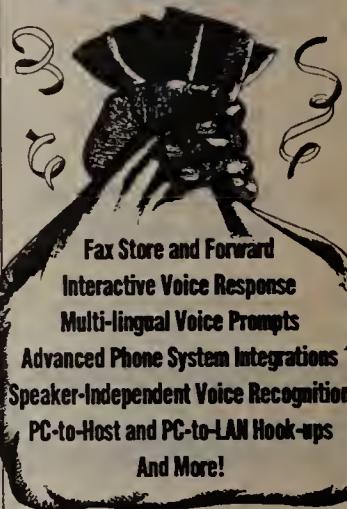
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(continued from page 40)

should be delivered and enter their fax machine number from a telephone keypad.

Not surprisingly, more and more IVR system vendors are adding fax response to their offerings. Syntellect, InterVoice and Centigram have all added fax boards that support fax response to their systems. Others, such as Octel, have added fax response capabilities using an adjunct processor that connects to their IVR system.

The main benefit of using an adjunct processor is that it frees up storage space and processing power on the main system.

The drawback is that it carries a higher cost than a system using integrated fax boards.

"We're real heavy into fax processing," Bank of America's Anderson says. One fax application enables real estate brokers to call the bank's loan department to make sure they have in their office all the documents their clients will need to apply for a mortgage.

"The bank is also thinking about using the system to allow brokers to obtain information about loans being offered and look up the status of a loan package by loan ID number," he says.

Bank of America uses a number of IVR systems from a variety of vendors, including Periphonics, InterVoice and Syntellect — all of which support fax response. "Different bank divisions made autonomous purchasing decisions, which is why we have a mix of vendors," Anderson says.

A number of service bureaus are also setting up fax processing operations to serve corporate subscribers. These service bureaus typically charge client companies a fee to store information on their machines so callers can have easy access to it. They also charge a usage fee for incoming

and outgoing calls.

Service bureaus can be attractive for companies considering implementing an IVR or fax processing application because they allow a company to test the effectiveness of an application before making a sizable investment in equipment (see "Services let users try before they buy," page 40).

Looking to the future

As the voice processing industry continues to mature, a number of trends continue to have an important impact on purchasing decisions and application design.

High-end 80386- and 80486-based PCs are becoming very popular system platforms. In the future, the next platform of choice could well be Reduced Instruction Set Computing-based workstations tied together by LANs.

Another major trend is the movement toward integrating all voice and fax processing functions on a single platform.

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Rather than forcing users to purchase separate, dedicated fax processing and IVR systems, many vendors are finding ways to build both voice and fax resources into a single system, running off the same CPU and using the same storage medium. In fact, as IVR systems increasingly become part of the overall office automation environment, the integration of voice applications with data and imaging applications is becoming a goal.

So when shopping for an IVR system, consider what host interfaces and other voice and fax processing functions you require and make sure the system platform you choose can support the combined load of all of these functions running concurrently.

In addition, consider the benefits of a high-level application generator that will enable you to quickly create applications. Take a close look at pulse-to-tone conversion or speech recognition if you anticipate that a large number of rotary phone callers will need access to the applications.

Choosing the right IVR system can help you improve customer service, boost the efficiency and productivity of your staff, and provide the valuable competitive edge that's so important in these challenging economic times. □

Robins is president of Robins Press, a New York-based publishing, market intelligence and consulting firm specializing in voice and fax processing technology.

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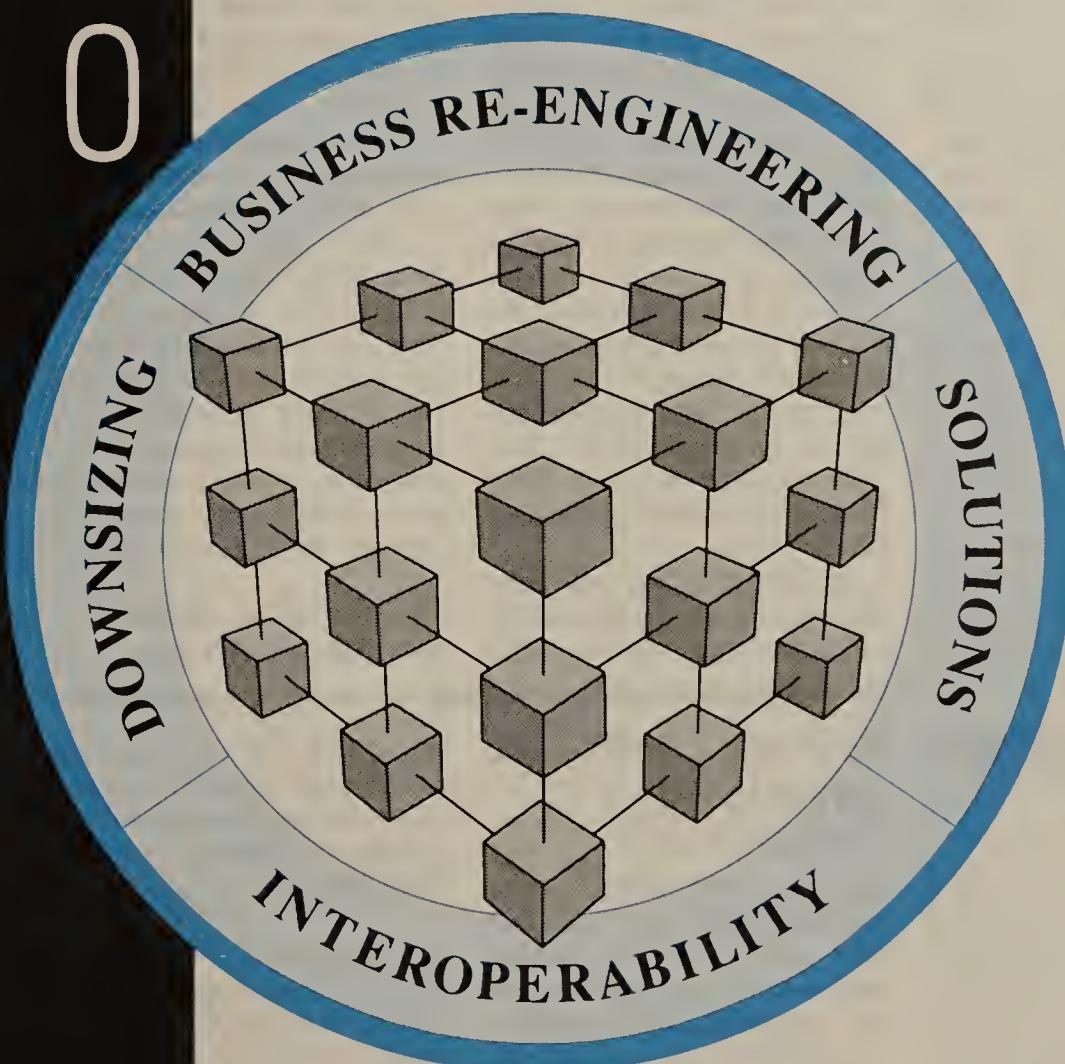
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AOVWN

Firms to align architectures

continued from page 8

WOSA architectures.

NAS is a suite of software services and APIs that enable applications on multiple DEC and non-DEC systems to access enterprise computing resources over a net. WOSA is Microsoft's set of APIs and development tools that make it possible to build Windows applications with built-in networking, database and messaging capabilities.

Creation of a common set of APIs for the architectures will let application developers write code to a consistent set of interfaces that bridge the environments.

DEC will also add support for Microsoft's WINsocks API in its transport protocol stacks, such as DECnet/OSI and Transmission Control Protocol/Internet Protocol, allowing Windows applications on a network to utilize various transport protocols.

Both companies also reaffirmed their intention to adhere to the Open Software Foundation, Inc.'s Distributed Computing Environment Remote Proce-

dure Call API for communications among distributed applications and to the SQL Access Group's interface for transparent SQL-based database access.

For SQL database access, Windows NT applications written to WOSA's Open Database Connectivity API or the SQL Access Group's API will be able to use DEC's SQL/Services software to retrieve data from SQL Access Group-compliant databases.

DEC and Microsoft said they will market a new jointly developed product called SQL Server Gateway for Rdb/VMS that will enable Windows application users to access data on DEC's Rdb/VMS databases. The product, based on Microsoft's SQL Server database engine, will be available in July.

DEC also said its X.400 electronic mail products will support Microsoft's Messaging Application Programming Interface, allowing message-enabled Windows applications to use DEC's X.400 servers for enterprise-wide mail services.

Analysts viewed the expanded relationship as a concession by DEC that its own desktop strategy

has fallen short of expectations. "DEC is realizing that Microsoft is controlling the desktop," said John Logan, an analyst at Aberdeen Group, Inc., a Boston consultancy. "DEC is saying it no longer has a strategy for the desktop. Microsoft will be the leader of DEC's desktop strategy."

Users generally agreed with Logan, although they pointed out that following Microsoft's lead is not a bad idea. "[Microsoft Chairman William Gates] might as well take over John's group," said Gary Mauler, fellow engineer at Westinghouse Electric Corp. in Baltimore, referring to John Rose, who recently departed DEC as vice-president of its Personal Computing Systems Group.

Mauler said DEC has credibility in large enterprise-wide environments but not at the desktop level. Microsoft, meanwhile, is the world's leading developer and marketer of personal computer software but is not strong at delivering enterprise-wide solutions. "Now they're bridging the gap," he said of both firms. □

Senior Editor Margie Wylie contributed to this story.

to the Link/100+, which supports 48 nonredundant or redundant T-1 links. Prices for the units run from \$8,000 to more than \$100,000.

A new track

"The T-1 vendors have, in the past, focused on the large customers who could really afford those big \$50,000 to \$70,000 bandwidth manager boxes," said Curtis Price, a data communications analyst with International Data Corp. in Framingham, Mass.

The new mux can be managed centrally by Ascom Timeplex's Time/View management platform, a key value-added feature, according to analysts. Time/View tracks network performance, status information, messages as well as alarms. □

Ascom Timeplex unveils mux

continued from page 4

Equipment Technologies, Inc. and Newbridge Networks, Inc. have also introduced low-end feeder muxes during the past year, and other firms are expected to follow, too.

"[Ascom] Timeplex has needed to enhance the Link line because they are perceived by users to be behind on basic technology," said Jeff Held, a principal at Ernst & Young, a Vienna, Va., consulting and research firm. "It's good to offer a product line that extends fully at both ends."

The price is right

The Link+ family currently extends from the microLink/2+

IBM offers 16M bit support

continued from page 15

has 20 unshielded twisted-pair ports, so a fully configured CAU can support a total of 80 ports.

When used with the concurrently announced media filters, LAMs can be attached to client workstations using IBM Category 3 unshielded twisted-pair cabling — the lowest grade unshielded wire available. The filters must be used at the LAM ports and each workstation Token-Ring card.

Previously, the existing Model 1 CAU and LAM could only support 16M bit/sec Token Ring using more expensive shielded ca-

bling. But using filters with Model 1 CAUs and the earlier LAMs makes it possible to use Category 4 or 5 unshielded cable instead of shielded wire.

Customers using IBM's existing 8228 Multistation Access Unit passive wiring hub can also achieve increased speeds over unshielded twisted pair by using the filters for transmission between the 8230 and each 8228 in a daisy-chained configuration.

The filters are available now. The workstation filters cost \$95 each, while the LAM port filters cost \$24 each. The 8230 Model 2 and new LAM will be available on June 26, priced at \$3,500 and \$3,050, respectively. □

Firm details net expansion plan

continued from page 2

marketing manager, "We're going to invest more dollars in the network over the [coming] years than BT [North America] spent to acquire Tymnet [which was \$355 million] in November 1989. The object is to keep the position we have [of offering] the greatest range of managed data network services in the greatest number of countries."

BT North America supports three types of access to its GNS

through the installation of new access nodes supported by the company's packet switches.

The service is available now, among other places, in Canada, France, Germany, Japan, the U.K. and the U.S. It will be supported in such countries as the Commonwealth of Independent States, Czechoslovakia, Egypt, Greece, Hungary, Indonesia, Malaysia, Norway, South Korea, Taiwan, Turkey and Zimbabwe.

"The user deals with one BT [North America] account manager, places one order, gets one bill in the currency of choice and

Frame relay service market projections

Figure 1

Port speed (bit/sec)	Number of ports				
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128K to 768K	42	435	946	3,018	6,792
1.024M and higher	42	621	2,019	7,042	16,555
Total ports	120	2,070	6,308	20,119	42,449

GRAPHIC BY SUSAN SLATER

SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

[looks to] one place for customer service," Cook said.

The company will also provide faster and wider access to its public frame relay service. It is building an international network of StrataCom, Inc. IPX multiplexers that will support port access speeds of up to 2.048M bit/sec. The carrier currently offers access speeds of 56K/64K on its Turbo Engine packet switches.

Those switches will also be enhanced to support higher access speed. Additionally, they will support fractional T-1 access speeds up to 256K bit/sec. Traffic from users that do not need more than that access speed will be handled by the Turbo Engines, while higher speed traffic will be

Users detail net features of pack

continued from page 2

book Viewer, a network-aware version of Windows Clipboard, and flag it as shareable.

Others on the network can then copy that information to a document created by another DDE-compatible application. NetDDE automatically updates copies of the information in linked documents when the original is changed.

Users will also be able to publish Object Linking and Embedding objects through the Clipbook Viewer, allowing them to share graphics and other data types across a network. A chat application based on DDE will also come with the Windows package.

A new Setup program will help users get started by installing the correct network drivers and other requested options.

Support for industry standard Network Driver Interface Specification drivers and "dual redirector" technology will let a personal computer simultaneously connect to multiple file servers using different protocols through one card, beta users said. Also, both versions are expected to include a Novell, Inc. NetWare client and many popular network interface card drivers, said testers.

Regardless of provider, all network services in Windows will be accessed through the Control panel, a single, graphical interface. DOS users will also manage their shared resources and attach to other network services through one command-line interface. A pop-up terminate and stay resident program lets DOS users log onto network services while in an application.

Despite a few rough spots in the pre-beta software, users said they were impressed with the

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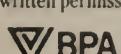
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handled by the IPXs.

Also, BT North America is the first frame relay provider to announce support for switched virtual circuits (SVC). It plans to have the Turbo Engines equipped to support SVCs in the fourth quarter.

Today, users with public frame relay nets must establish a permanent virtual circuit — basically a private line — between points in a frame relay network. SVCs enable users to establish a dial-up connection, similar to a telephone call, for a frame relay transmission. The SVC is torn down when the call is completed.

Analysts say current X.25 users may find SVCs a more efficient alternative for a variety of applications requiring infrequent data communications among sites.

"There is definitely demand for SVCs," said Steve Sazegari, a director and principal at Dataquest, Inc., a San Jose, Calif.,

market research firm. "I see SVCs eventually being used to support point-of-sale, E-mail and EDI applications."

The Turbo Engine upgrade will also enable the switches to perform X.25-to-frame relay conversion that would be especially appealing to users with international network needs.

A company using a public frame relay service could have data converted to X.25 for delivery to sites served by PTT public data networks. Users with terminals supporting the Telnet virtual terminal protocol will be able to use the switches as a gateway to hosts on the BT North America network that support the protocol.

On the sales side, BT North America will offer users a new pricing structure based on feature sets and higher access speeds. It would not, however, divulge pricing information. □

BT North America's global frame relay rollout plans

Figure 2

Location	Today	Year end	1Q 1993
U.S. and Canada	Local access from 160 cities to nodes in Chicago, Dallas, Denver, Los Angeles, New York, San Francisco and Washington, D.C.	Local access from 360 cities to nodes in Atlanta; Austin, Texas; Birmingham, Ala.; Boston; Charlotte, N.C.; Detroit; Houston; Minneapolis; Newark, N.J.; Phoenix; Philadelphia; St. Louis; San Francisco; Seattle; Toronto; and Tulsa, Okla.	Not applicable
Asia/Pacific Rim	No nodes	Nodes in Hong Kong, Singapore and Tokyo	Nodes in Osaka, Japan; Sydney, Australia
Continental Europe	1 node in Paris	Nodes in Amsterdam; Brussels, Belgium; Frankfurt, Germany; Stockholm, Sweden; and Zurich, Switzerland	1 node in Madrid, Spain
U.K.	2 nodes in London	Nodes in Birmingham and Manchester, England	1 node in Edinburgh, Scotland

GRAPHIC BY SUSAN SLATER

SOURCE: BT NORTH AMERICA, INC., SAN JOSE, CALIF.

LAN Manager-based file and printer sharing offered in both packages.

"It's going to kill NetWare Light because it offers everything [NetWare Light] does, plus more," one beta user said. The file-sharing capability will let users publish local drives or printers other users access from any other LAN Manager client, such as another Workgroups PC.

Setting limitations

Users who open their local resources to network access can attach comments to the resource name, restrict user access with privileges and passwords, and limit how much of their machine's processor can be used for sharing functions.

The new Microsoft Mail 3.0 client, also due in both the DOS and Windows packages, will let users in small workgroups exchange messages using any local-area

network file server as a central storage point or "post office." To mail outside the workgroup, use gateways or get full administrative capabilities, the client can also be used with an MS Mail 3.0

It's going to kill NetWare Light because it offers more," said one beta user.



server, which will be sold separately starting this summer.

Windows for Workgroups is expected by year end and MS-DOS Connection for Workgroups is expected in 1993, sources said. Microsoft refused to comment. □

IBM, Parallan to announce deal

continued from page 2

corporate partner [for several months]." He did admit, however, that IBM is one of the companies Parallan has approached with partnership possibilities.

The reason for the search, he said, is Parallan does not have the sales and support infrastructure to successfully market its products. "Without question, IBM could provide us with the sales, support, staying power and security we need," Fields said.

IBM was of particular interest to Parallan, Fields said, because the only operating system Parallan's Server 290 superservers support is IBM's OS/2.

IBM declined to comment on the agreement.

The deal would be "extremely good news" for Parallan, according to Sandra Gant, an analyst at InfoCorp, a research and consulting firm based in Santa Clara, Calif. Because Parallan has been having some financial difficulties, bringing it into IBM could mean the difference between success and failure for the company, she said.

For IBM, the superservers will fill a hole in its current product line, according to Michael Heylin, senior associate at Creative Strategies Research International, a research and consulting firm in Santa Clara, Calif.

"The [Personal System/2] Model 95 is powerful, but IBM still hasn't licked the multipro-

cessing side, which is important for servers," he said. Parallan's highest end server, Server 290, supports as many as eight processors.

"Parallan's multiprocessing technology [has] got to be intriguing to IBM," Heylin said. "The iron isn't a big deal, but in a partnership with Parallan, the multiprocessing has to be the jewel for IBM."

He also pointed out that because Parallan's Server 290s support both Microsoft Corp.'s LAN Manager — which is equivalent to IBM's LAN Server — and Novell, Inc.'s NetWare, the machine fits nicely into IBM's local-area network strategy. The superservers could be used as high-end applications or database servers in either of these environments or in a mixed LAN environment.

IBM is expected to mention the Parallan agreement at this week's unveiling of a new high-end PS/2 server. The machine, introduced in Europe last month, is expected to be a PS/2 Model 95 based on Intel Corp.'s recently announced 50-MHz 80486 chip.

The new PS/2 will come on the heels of last week's release of IBM's new high-end, rack-mounted RISC System/6000 server. Called the PowerServer 970, the new machine, which runs IBM's AIX Unix-based operating system, gives users much-needed I/O expansion capabilities.

The PowerServer 970 will be available June 26, with a base price of \$94,500. Pricing for the PS/2 was not available. □

Tariff 12 ruling will help some

continued from page 4

Tariff 12 changes, dozens of users have unsuccessfully tried to modify their deals. However, the FCC's bewildering set of new rules has created difficulties for other users. Those who had asked for service but had not signed contracts by April 16 will apparently have to change their 800 number to get custom deals.

Also, existing Tariff 12 customers that want to switch to another network option under Tariff 12 — which has happened several times — may be treated like new customers and be forced to change their 800 number.

This leaves customers such as National Data in limbo. National Data has purchased service under Tariff 12 Option 67 since January 1991. By late 1991, the computer company's usage exceeded the \$6.9 million minimum annual charges for Option 67, and it began looking for a larger deal to suit its needs.

On January 17, National Data formally requested to switch to Option 46, which had a \$9 million

minimum annual charge and lower prices than Option 67.

However, National Data has not been able to switch to the new option. In a letter sent to FCC Chairman Alfred Sikes in March, National Data attorneys complained that AT&T was purposely dragging its feet.

"AT&T's apparent goal is to lock National Data and similarly situated customers into their current options and preserve AT&T's existing revenue stream, yet be in a position to blame the [FCC] for its customers' ill fortune," stated Joseph Markowski, National Data's counsel.

A number of resellers tell similar stories. At least 13 resellers have been trying to purchase Option 58 under Tariff 12, some of which say they started negotiations in 1991.

Although the FCC did not address any specific customer's status, the order said the FCC was aware that several users had complained that AT&T had unreasonably delayed their purchasing service, and it left open the possibility of extending the provision if the FCC determines that that was the case. □

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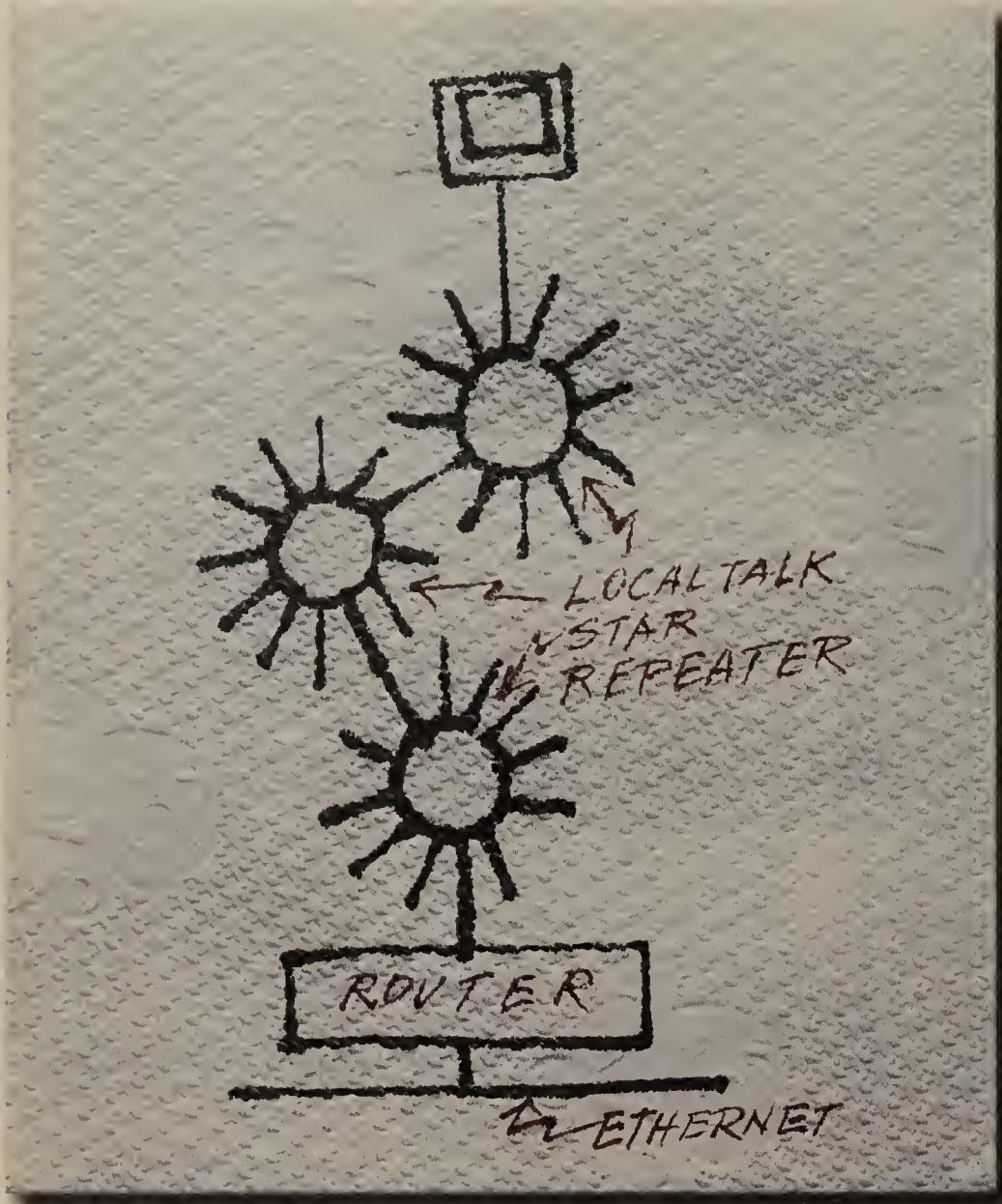
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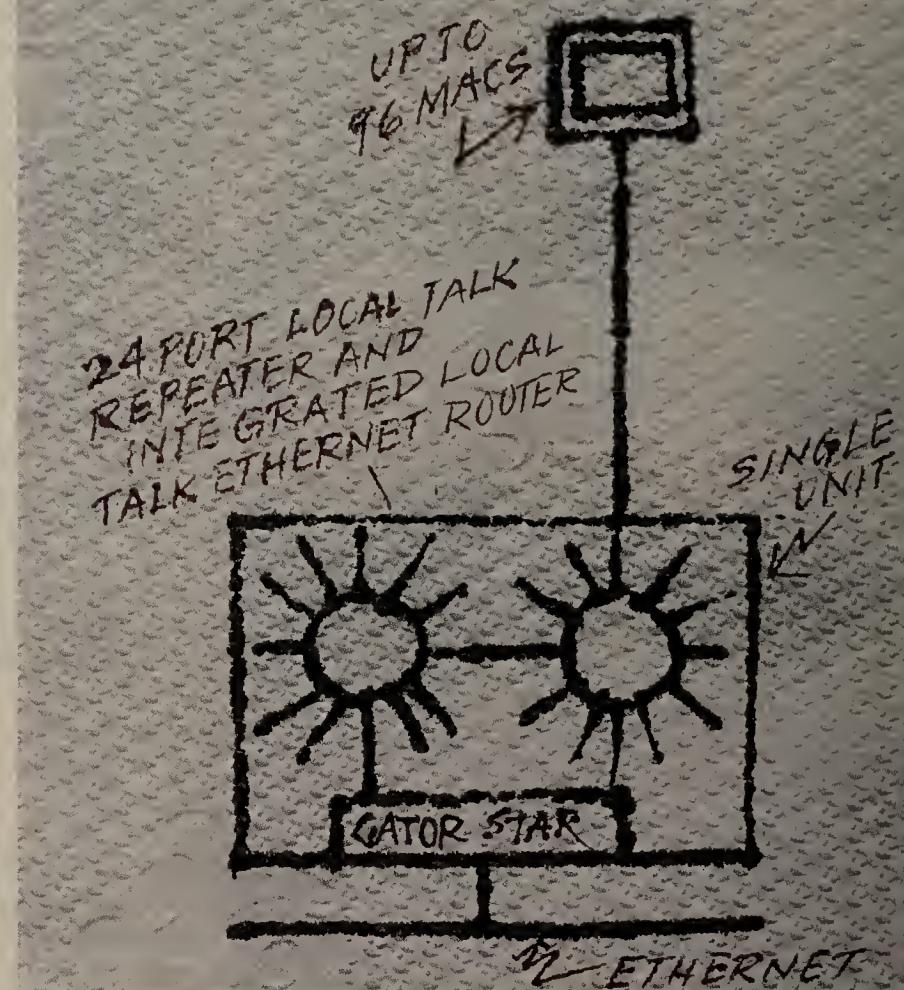
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